

# ARCHITECTURAL RECORD

**NEWS**

**TRENDS**

**BUILDING TYPES (HEALTH CENTERS)**

# CONTROL MASONRY DRAINAGE

*This Simple Inexpensive Way*

## Easy-to-install Anaconda Through-Wall Flashing provides effective protection against wet walls and heaving by frost

In addition to providing drainage in any desired direction, by means of an integral dam, Anaconda Through-Wall Flashing offers these three distinct features:

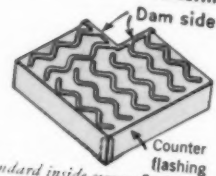
1. 7/32" high zig-zag corrugations provide positive bond with the mortar in all lateral directions.
2. Flat selvage permits neat, sharp bends for counter-flashing or locking to adjacent sheet metal without distorting the flashing or interfering with free drainage.
3. It is easily locked endwise, even with

edges bent, merely by nesting one or two corrugations. Such assemblies are water-tight because of the raised corrugations.

Made of 16-ounce Anaconda Copper for standard 8" and 12" walls, these flashings are stocked by leading sheet metal supply houses in 8' lengths, together with unique one-piece corner flashings which provide effective and easy assembling. Also available in special widths with various selvages.

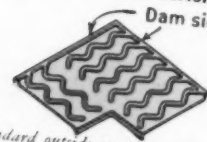
*Installing Anaconda Through-Wall Flashing in the Liberty National Bank, Washington, D. C. Architects: Schreier & Patterson, General Contractor: C. Wohlgenuth, Jr., Sheet Metal Contractor: Crouch & Burke—all of Washington, D. C. Anaconda Through-Wall Flashing supplied by York Corrugating Company, Washington, D. C.*

### INSIDE CORNER FLASHING



*Standard inside corner flashing unit. Dam on inside, drains out.*

### OUTSIDE CORNER FLASHING



*Standard outside corner flashing unit. Dam on outside, drains in.*



# Anaconda Copper

THE AMERICAN BRASS COMPANY—General Offices: Waterbury, Conn.  
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Subsidiary of Anaconda Copper Mining Company

# ARCHITECTURAL RECORD

COMBINED WITH AMERICAN ARCHITECT AND ARCHITECTURE

## IN THE RECORD NEXT MONTH

SCHEDULED AS OCTOBER's front-of-the-book feature is a 10 to 12-page news story on *housing*. Pictorial and textual presentation will spotlight two projects recently completed in California and Texas: the one, Holly Courts in San Francisco—interesting in design, its poured-concrete flat-roof construction, and its location on a wooded hillside; the other, Parklane Apartments in Houston—a million-dollar FHA job, characterized by its unusual grouping on an 8-acre strip of land, white-sanded metal roofs, and a liberal use of glass block. Other buildings in the News and Trends section will be a 4-story furniture and clothing store recently erected in Chicago; and a professional building for a Missouri dentist, where pre-appointment apprehensions are soothed by a 1½-story waiting room with huge windows and a fireplace.

The second installment of "Art Forms in Architecture" will offer two papers, one by David Smith, New York sculptor, and the other by Ruth Reeves, designer, and winner of a 1940 Guggenheim Fellowship. Another timely article, since October 6-12 is Fire Prevention Week, will be a story by Percy Bugbee, General Manager of the National Fire Protection Association, advising how architects, through improved planning, can be of greater help in keeping the firewagons under wraps.

Also appropriate, while the kiddies everywhere are working up lusters on the first apples for teacher, will be a Building Types study on "Neighborhood Schools," concentrating chiefly on types for secondary education, though some consideration will be given to elementary institutions. Included will be a basic article by educational authorities on background aspects of the subject—relation of school to neighborhood, neighborhood to school; integration of respective activities; "the school as a laboratory for instruction in living"; etc. Time-Saver Standards and Case Studies will provide planning data and exemplary problem solutions.

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● The portland cement stucco facade of this new C. B. S. studio was applied quickly and economically over the old front—then polished mechanically to a smooth, hard surface. Architect: Fellheimer and Wagner, N. Y.; Plastering Contractor: F. L. Hewes, N. Y.; Stucco Manufacturer: Artstone Rocor Corp., Brooklyn.

**IT DOESN'T LOOK LIKE STUCCO  
IT DOESN'T FEEL LIKE STUCCO**

**...BUT IT IS**

# STUCCO

**I**T'S as hard as granite and as smooth as your watch crystal... but actually the clean, crisp facade of the Columbia Broadcasting Company's new studio is portland cement *stucco*—finish coat of Artstone stucco made with Atlas White cement!

After the stucco was applied, its 4428 sq. ft. of surface was ground and polished mechanically with carborundum bricks... in much the same manner as a terrazzo floor. Result is a smooth, rock-hard, semi-glazed surface that repels dust and dirt particles, and can easily be cleaned with soap and water.

Here, then, is an old material in a new dress particularly suitable in cities where dust, smoke and oil fumes dirty modern structures. Stucco was highly economical—it made it possible to modernize without ripping out the front of the old building to stay within the building line. Projections were removed, the many window openings were bricked in, the old brick and limestone front was roughened and scratch, brown and finish coats of stucco applied.

Let portland cement stucco made with Atlas White cement help build your next house or remodel your next building. It blends well with any architectural style or material. And it's surprisingly low in initial and upkeep cost. Universal Atlas Cement Co. (United States Steel Corporation Subsidiary), Chrysler Building, New York City.

**Offices also at:** New York, Chicago, Philadelphia, Boston, Albany, Pittsburgh, Cleveland, Minneapolis, Duluth, St. Louis, Kansas City, Des Moines, Birmingham, Waco.

● Polishing stucco surface with carborundum bricks.

**FACTORY-MADE STUCCO IS PREFERABLE**

AR-8-21

## ATLAS WHITE CEMENT

A UNIVERSAL ATLAS PRODUCT



ARCHITECTURAL RECORD



# 5

# RETAIL STORES

## PLANNED FOR A MOTOR AGE

Undoubtedly the dominant factor in the trend toward locating individual department stores and entire shopping centers (See AR, 6/40) on the periphery of cities is the condition produced by general use of the automobile. For a time increase in motor travel merely meant that it was easier for more people to get to the city for shopping. Soon, however, downtown sections frequently became hopelessly congested, and the ease of moving about was canceled out by the impossibility of finding a place to stop moving within a reasonable distance from the retail stores.

In various localities, the situation has been considerably alleviated—at least temporarily—by converting near-by nonprofitable property into parking lots, by building downtown parking garages, and—in some instances—by providing parking space either on the roofs or in the basements of buildings.

Instead of partial cures of this sort or such annoying palliatives as reducing the parking time per car at the curb, certain stores have found it expedient to remove their locations from the congested downtown area altogether. The outlying site is large enough to include within it ample parking areas as well as the store itself. As a rule, location is chosen in an established or fast-growing neighborhood, on or convenient to major traffic lanes, and readily accessible to the more densely populated metropolitan area.

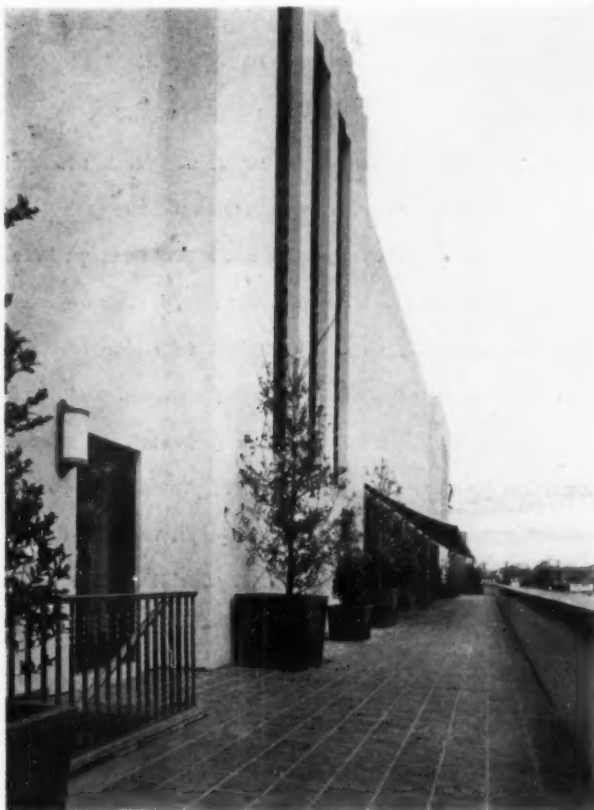
Noteworthy exponents of this type of development are the large branch stores of Sears, Roebuck, and Co., which for several years has been a leader in providing more efficient retail-store units for a motor-age public. On the next eleven pages we show five of this organization's recent stores, each of which includes extraordinary facilities for the comfort and convenience of on-the-move shoppers—services which range from generous parking space to automobile service stations to community buildings. Of special interest to architects is the fact that, though the stores are located in widely separated communities, all five were the work of a single architectural firm.

## FIVE STORES FOR SEARS-ROEBUCK

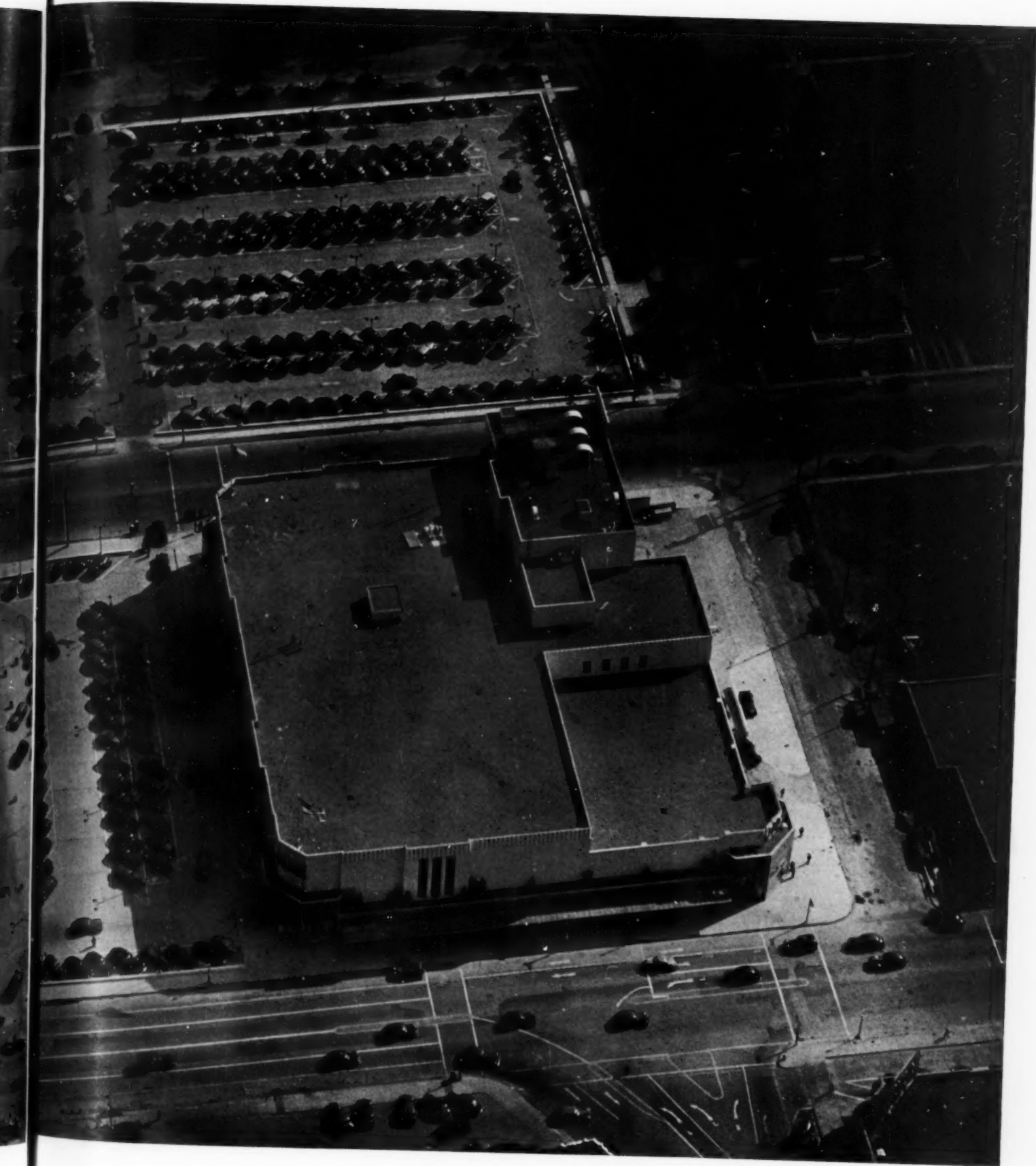
Architects for the five stores in California, Illinois, Maryland, Michigan, and Texas were NIMMONS, CARR & WRIGHT of Chicago. Each of these perimeter shopping centers was designed "to provide for substantially every need of the customer from air in an automobile tire to a place to lunch after completing purchases."

ALL OF THE stores are located at some considerable distance from the downtown districts of the great metropolitan centers within or near which they occur—Baltimore, Chicago, Detroit (Highland Park), Los Angeles (Glendale), and Houston. Each is so located that the potential customer from the city may find convenient parking, the local customer may make the trip on foot or by automobile, and the suburban customer may stop and make purchases conveniently on the way either to or from the city.

Typical of the layouts, with their large amount of parking space and many service buildings, is the Houston development, shown in the large air view at right. The plans of all five stores, shown in drawings on the subsequent two pages, follow this same basic scheme in general. Below is a view of a balcony of the Houston store, which overlooks the parking area between the main store and the service building.



Bob Bailey

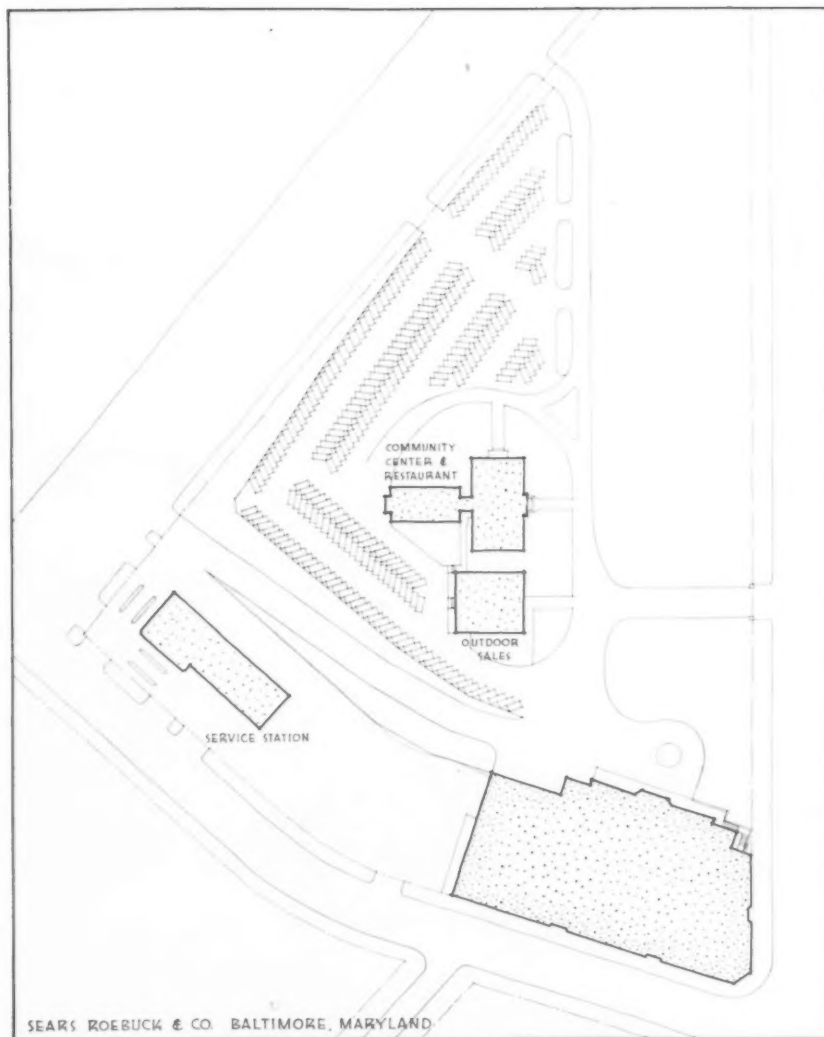


SEPTEMBER 1940





Highland Park



## PLOT PLANS

THE PLOT PLANS of all five stores follow the same basic pattern. Differences are due largely to the nature of the land available and its relation to foot and automobile traffic.

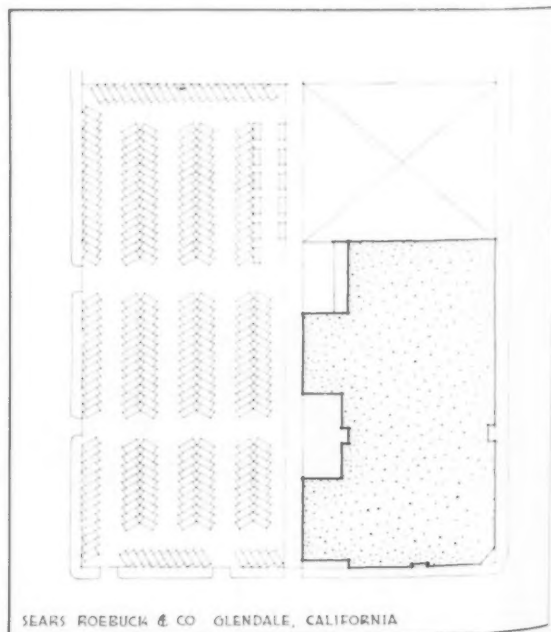
In Houston, the store lies between two major through-traffic highways. Between the main store and the service building is the smaller parking area, primarily for use of cars being cared for at the service station. Across the street is the large parking lot. Automatic stop lights protect the customer in crossing this highway to reach the store.

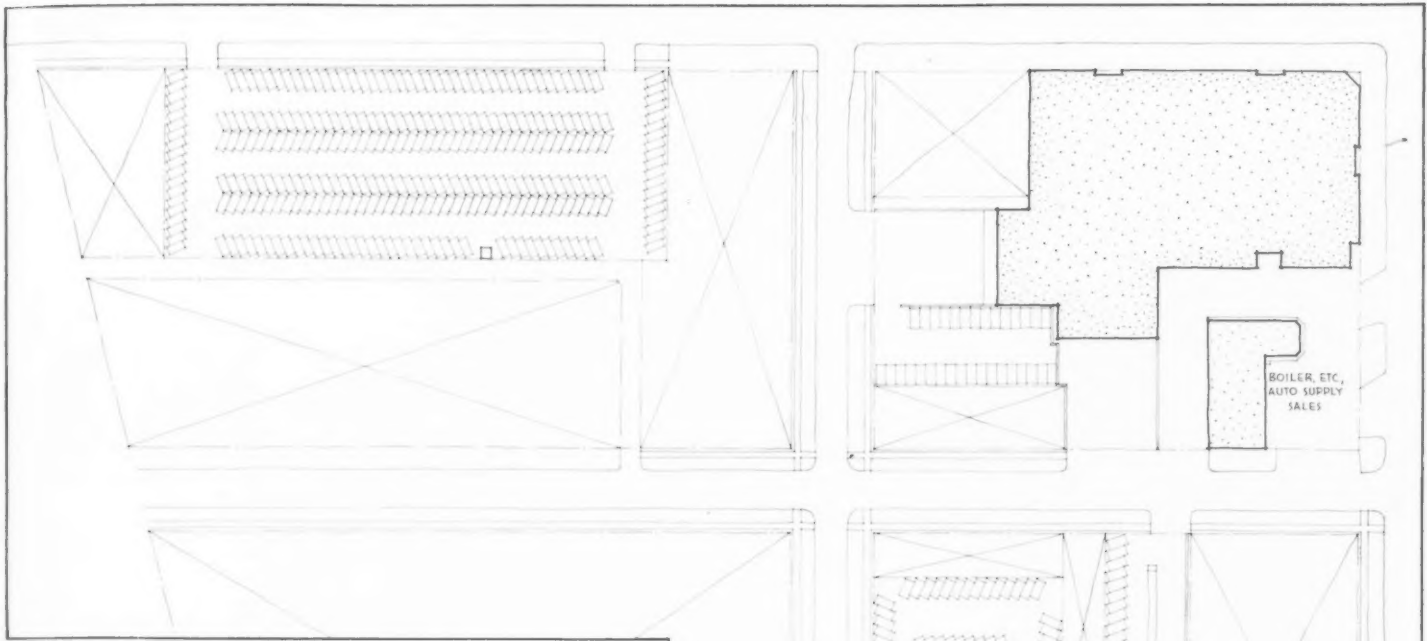
In Highland Park, Mich. (Detroit), the store faces a major street, with secondary streets at either end. The service station and parking lot are located on one of these secondary streets. On the other are provisions for receiving, shipping, and customers' automobile service.

In Glendale, Calif., arrangement of facilities is similar to that at Highland Park, although more restricted.

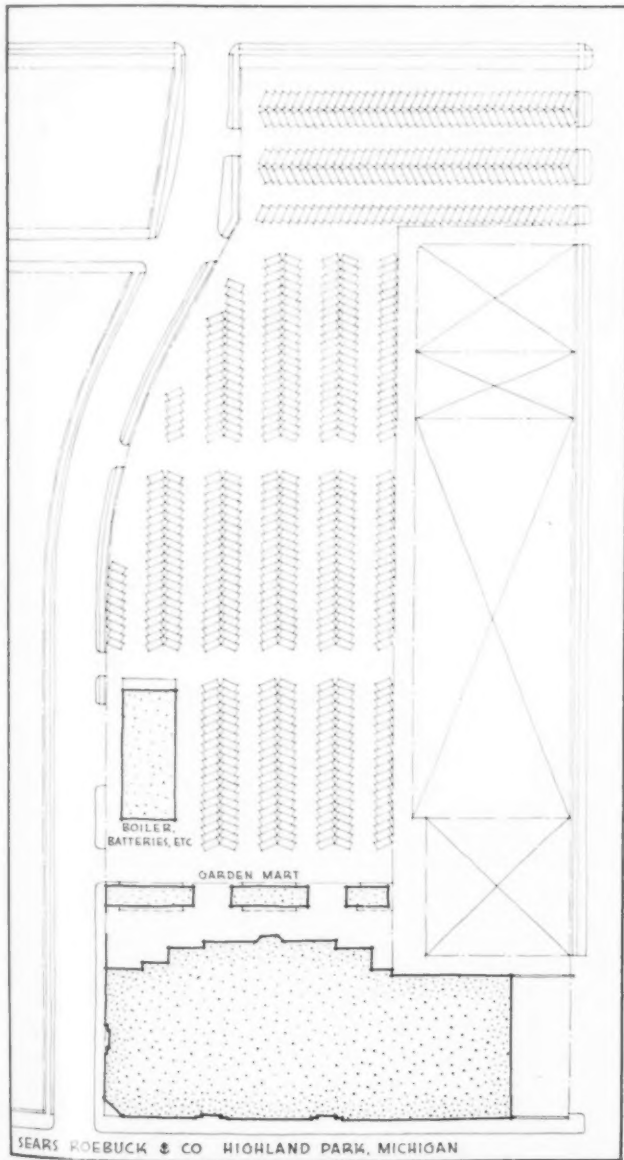
The Chicago layout offers considerable variation from the base type, since the location required a more compact arrangement, and parking facilities had to be arranged in nearby blocks instead of as part of a single plot.

An unusual sloping site at Baltimore produced another untypical layout. The building fronts on two major streets from which foot traffic may enter, but the main parking lot and entrance are at the second-floor level at the rear. Another unusual feature of the Baltimore plan is the inclusion of a community building, which is available upon request to the management for meetings of local organizations.

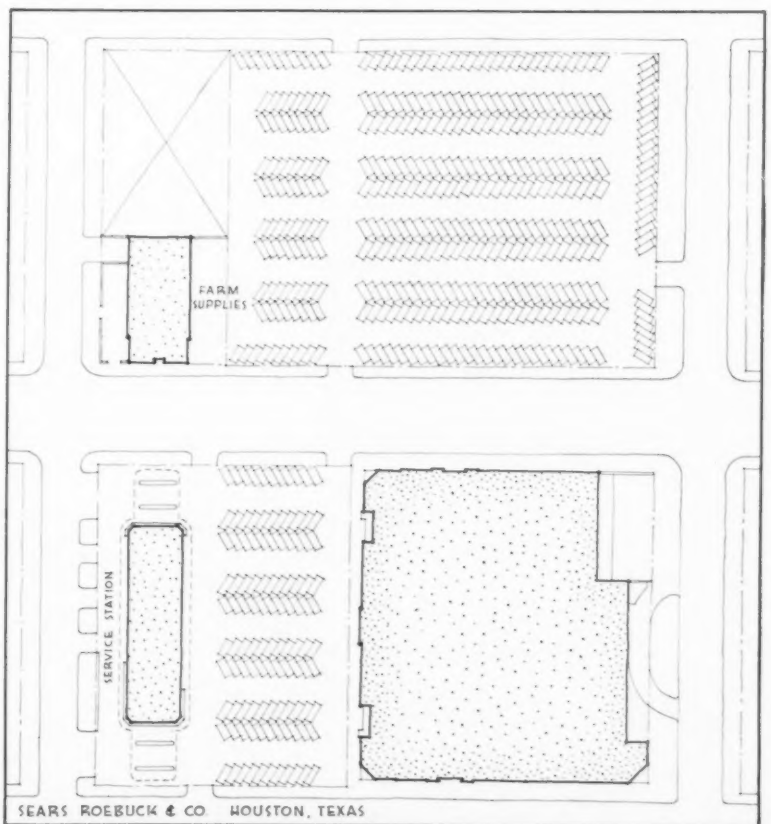




SEARS ROEBUCK & CO CHICAGO, ILLINOIS



SEARS ROEBUCK & CO HIGHLAND PARK, MICHIGAN



SEARS ROEBUCK & CO HOUSTON, TEXAS



Above, general view of the Houston store, showing large corner display windows. Below, side of the store facing the service-station parking lot. The photographs on the facing page are two angles on the automobile service station.



IN THE PROVISION of services and facilities over and above those of the store proper, the Sears-Roebuck stores are unusually noteworthy. Each scheme is, of course, developed around the most efficient store unit possible. Almost as important is the convenient parking area of sufficient size. And in all of the layouts there is a fully equipped automobile service station, which in some instances becomes a secondary salesroom in itself. Additional service structures are added as they seem necessary in a particular locality. Where a store is adjacent to a major farming region, as at Houston, a separate building is provided for the display of agricultural machinery of all sorts. Within the different stores themselves, in addition to the customary merchandising services, there are usually provided a barber shop, a beauty parlor, a shoe-repair shop, drug counter, lunchroom, and pet shop. Among the extraordinary services for the customers are departments set up to aid in such things as determining the proper-size pump needed for a water supply, recommend and lay out an efficient heating plant, and even to prepare for the construction of a complete house.





Chicago

### DEPARTMENTS AND DISPLAY

DEPARTMENTAL LAYOUT and display technique in such large retail stores as Sears-Roebuck's are the direct result of mass-merchandising needs. Two factors in particular determine the basic arrangement—the fact that there will be large crowds of shoppers and the desire for the greatest convenience possible in getting customers and merchandise from the store to exits and waiting automobiles.

Adequate space at entrances and exits is planned to avoid as far as possible the congestion that occurs at these points during heavy traffic. Aisles between display cases are wide enough to permit easy movement of large numbers of customers. This extra width is also used for the introduction of special tables down the center on which are displayed the various items that are on particular sale at the moment. Placement of escalators in as central a position as possible is planned so that movement to and from them may be quickly made from every direction.

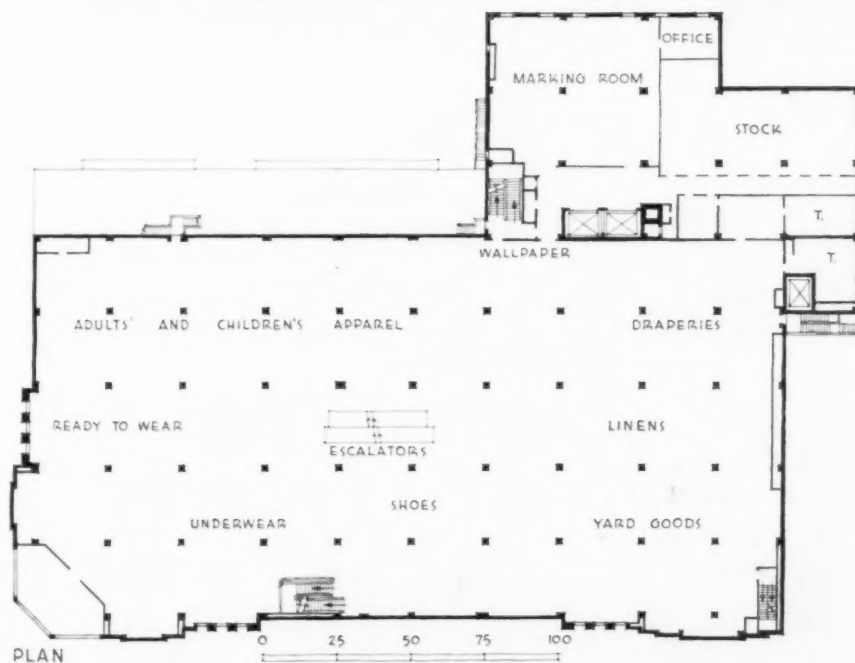
The fact that merchandise is usually carried away from the store by the customer is a basic consideration in the location of the departments themselves. As a rule, the basement is given over



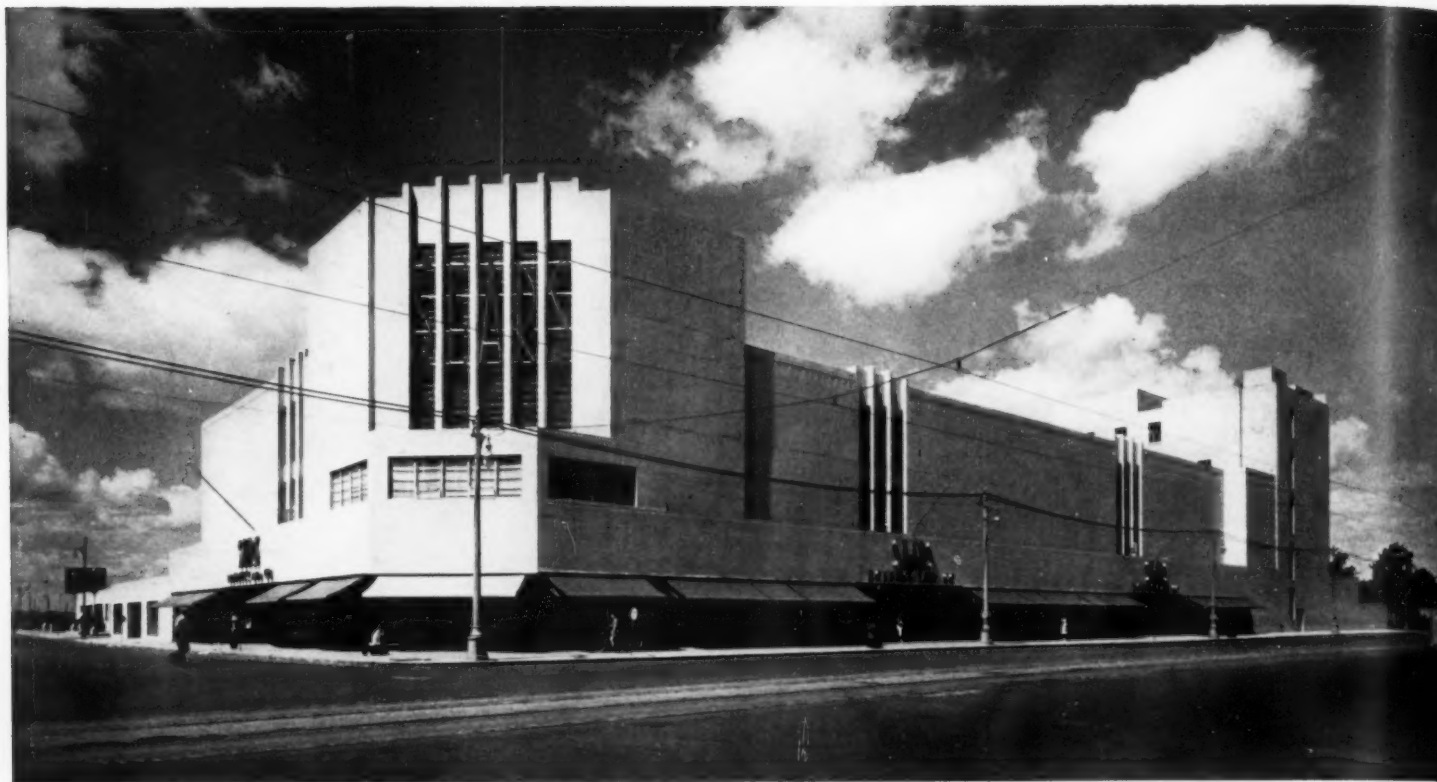
to heavy merchandise such as auto supplies, sporting goods, washing machines, refrigerators, etc. On the ground floor are infants' wear, hosiery, boys' and men's furnishings, shoes and clothing, candy, drugs, stationery, jewelry, notions, tailor shop, and optical department. The soda fountain and lunch counter may be either in the basement or on this first floor.

Topography or special local conditions often produce wide variations from this basic scheme. In the Baltimore store, for instance, with its entrances at two different levels, the arrangements had to be considerably altered. In the Chicago store, it was deemed desirable to make the entire basement area into a food mart (photo at bottom of page).

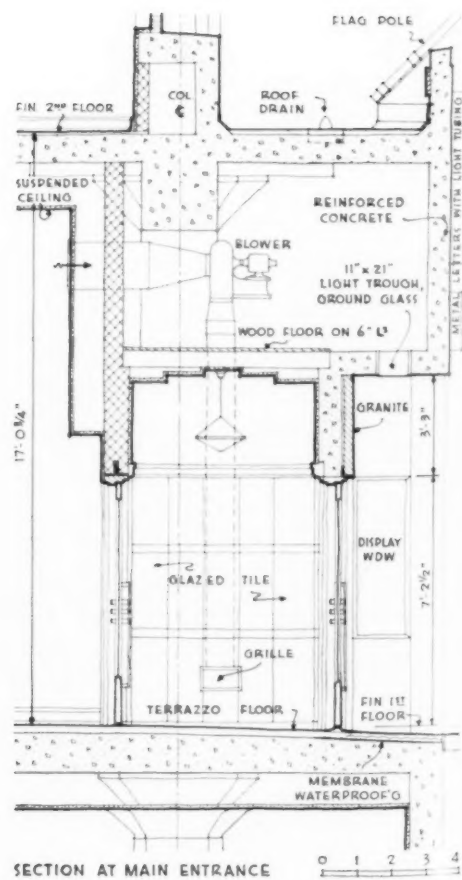
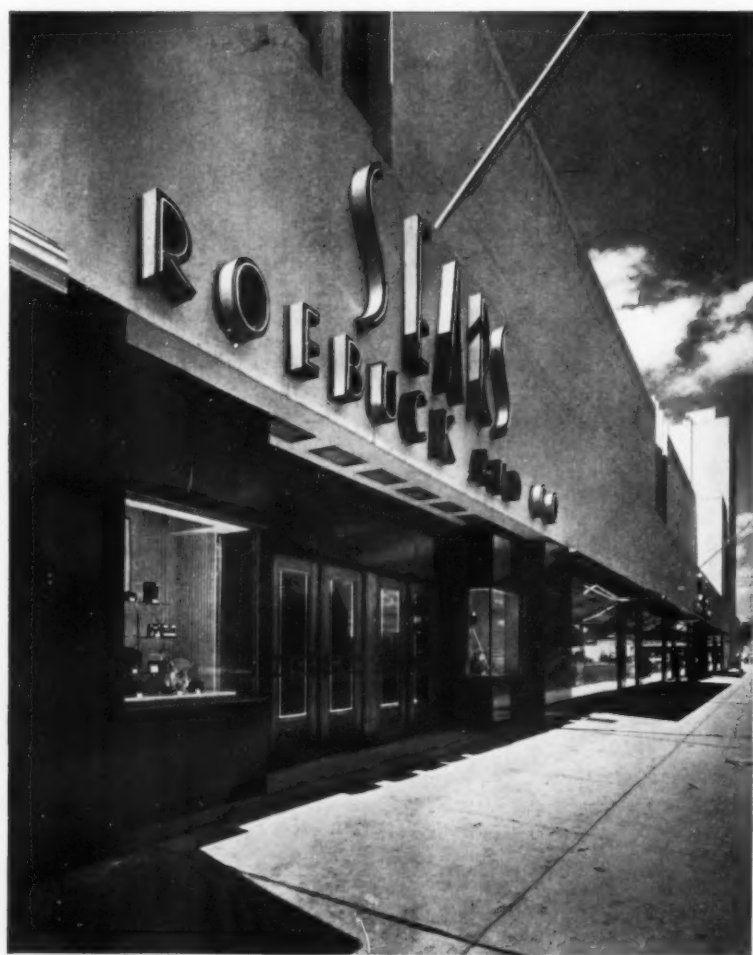
Display windows follow recent trends. Once it was thought that the larger these were made, the better. Modern selling technique, however, requires the arrangement of special windows for special purposes, and in these stores windows run the gamut of size from small ones for the display of small objects, such as jewelry, up to the main display window in the Baltimore store, which is substantially a stage in area, height, and the lighting facilities provided.

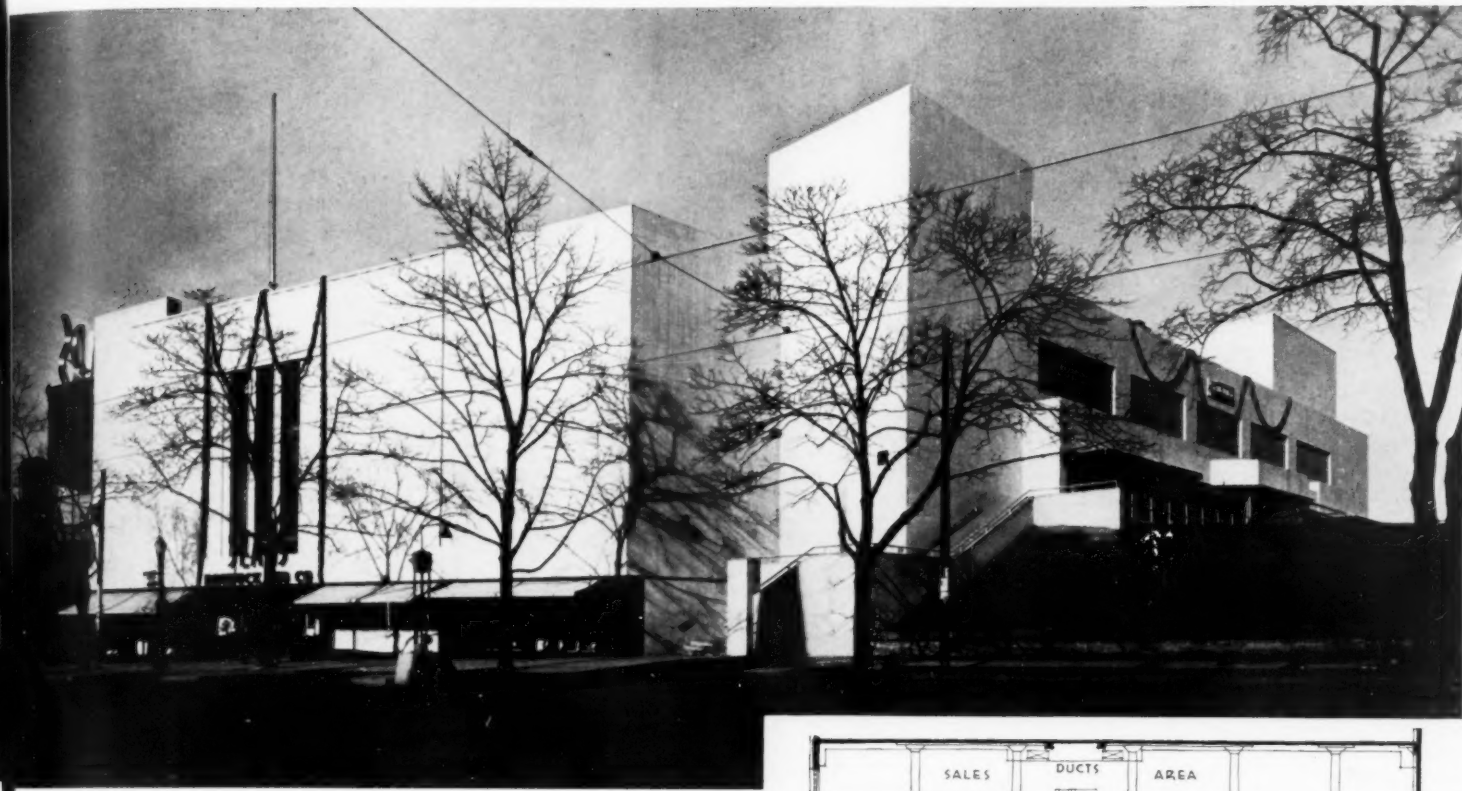






Highland Park





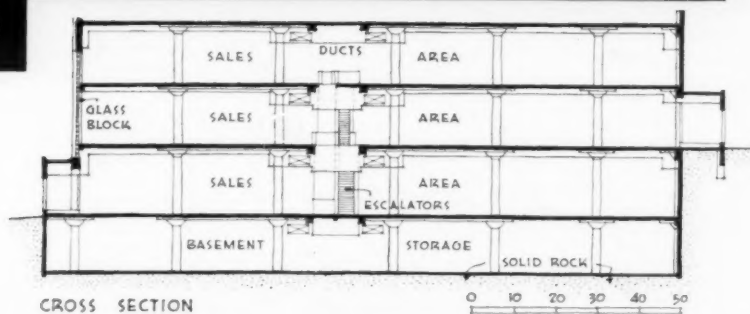
Baltimore

### CONSTRUCTION

ALL FIVE of the stores are of reinforced concrete, with girderless, flat-slab floors. Exterior walls consist of 8-in. reinforced concrete, a 2-in. air space, and 4 in. of furring tile, finished in plaster. Roofs are dead level, surfaced with pitch and gravel. Expansion and contraction are taken care of by the use of weakened planes, introduced at strategic locations by tacking wood or metal strips to the forms, leaving narrow vertical grooves in the concrete on the inside and outside walls. Volume-change stresses are thus relieved, and tendency to crack is confined to the joints. There was no effort to secure special surface treatments other than a careful spading of the concrete and a studied arrangement of the plywood form panels.

On the interior, floors are of terrazzo in basements, first floors, and washrooms. Asphalt tile is used on the second floor and in executive areas; receiving and shipping rooms have cement floors. Ceilings are of plaster on suspended metal lath.

The buildings are essentially windowless. Glass-block panels at the ends of aisles are more for decoration than to furnish light. Basic reasons for choosing the windowless scheme: greater usable floor and wall space; reduction of heat and cold losses; insulation from outside noise; a minimum of openings allowing infiltration of soot and dirt.



CROSS SECTION



Houston

**NIGHT-LIGHTING**

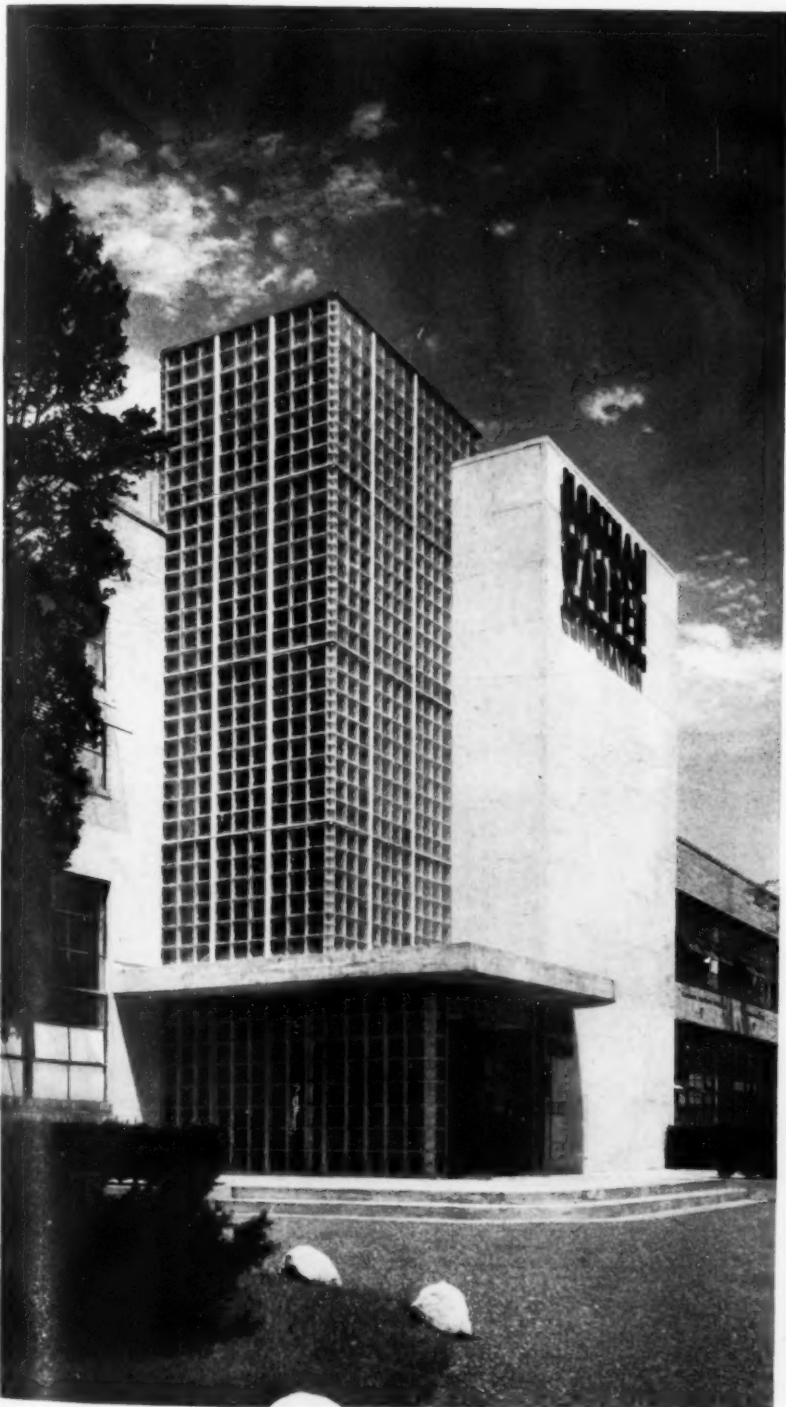
EXCEPT FOR the incidental, decorative panels of glass block, the only outside windows are the display windows. As described before, these range in size from the small window for small objects all the way up to two-story display stages built across one corner. Although show-window lighting is largely conventional, the night effect of the stores is both studied and effective. The giant neon-lighted word SEARS serves as a trademark and dominates the arrangement in each case. The show windows form bright light strips at the base. On special occasions, the buildings themselves are floodlighted.

Only in the Baltimore store's large corner window is there a definite departure from standard lighting schemes. Here the window is equipped with dimmers, spotlights, and similar theatrical devices.

Glendale







## A COSMETIC FACTORY MOVES TO THE COUNTRY

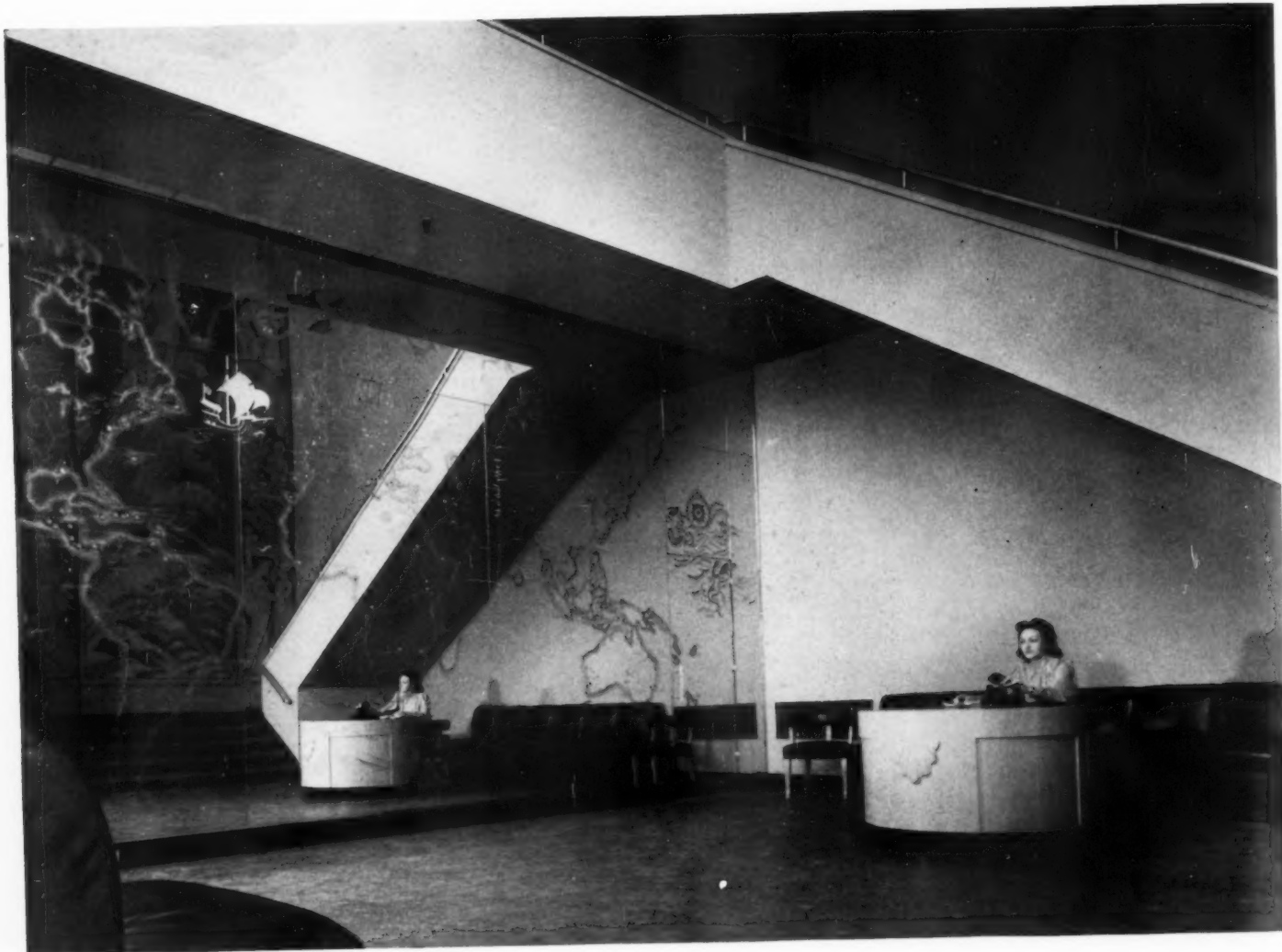
In line with the trend of decentralization of industry, the Northam Warren Corp., manufacturers of Cutex, Odorono, and other cosmetics, decided to move their factory and offices from a New York City location to suburban Connecticut. The striking new structure was designed by the Office of IRWIN S. CHANIN, Architects and Engineers.

IN CHOOSING A SITE beside a golf course in Stamford, Conn., the company was guided by two controlling factors. The location must be adjacent to rail transportation and near enough New York for quick and easy travel back and forth. The unusual care given to the appearance of the factory structure and the planting of the grounds grew out of managerial conviction that all employees should work under as near to ideal conditions as possible, both for their own good and for the salutary effect this would have on morale and efficiency.

A definite effort was made to include in the design of the building a reflection of the fact that the company manufactures luxury products. The glass-block tower on the exterior and the glittering entrance lobby are instances of this conscious effort.

As an indication of the excellent daylighting of the building, it is estimated that about 75% of the exterior walls is of glass. In addition to the long horizontal sash, interior light is provided for the second floor through a series of roof monitors. Exterior surfacing is of grayish buff brick with cast-stone trim.

On a 9-acre piece of property, the building itself contains approximately 3 acres of ground-floor area. Included in the plot are a railroad siding, convenient access to motor highways, and adequate parking space.



Entrance lobby

Stair landing



Photos by Richard Garrison

Warehouse



ARCHITECTURAL RECORD

## COSMETIC FACTORY

Office of IRWIN S. CHANIN, Architects and Engineers

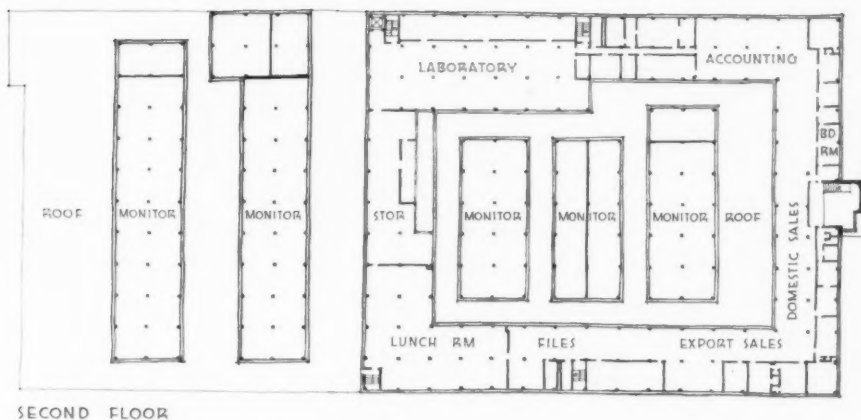
THE GROUND FLOOR of the building is about 240 by 520 ft. in area. The second floor extends to full width of the building and back about 300 ft. The main-entrance glass tower rises to a height of 40 ft.

The entrance lobby is a sparkling room the full two stories in height, with a dramatic staircase running up one side. One wall of the lobby is of mirror, with a map painted on it showing the sources of some of the company's raw materials. Facing the mirror wall, on a stair landing is an 8 by 14-ft. mural depicting the history of the art of cosmetics.

The factory area on the first floor provides space for the storage of raw materials, manufacturing and packaging equipment, and areas devoted to storage and forwarding of products by either railroad siding at the rear, or truck-loading platforms at one side.

On the second floor are the executive offices, research laboratory, color studios, manufacturing and control laboratories, and employees' lunchroom.

Also included in the layout are a laundry, printing plant, and locker and dressing rooms for a force of about 500 persons. The structure is heated by steam from its own oil-fired plant; all machinery is operated by electricity.



SECOND FLOOR



FIRST FLOOR

Laboratory



Board room



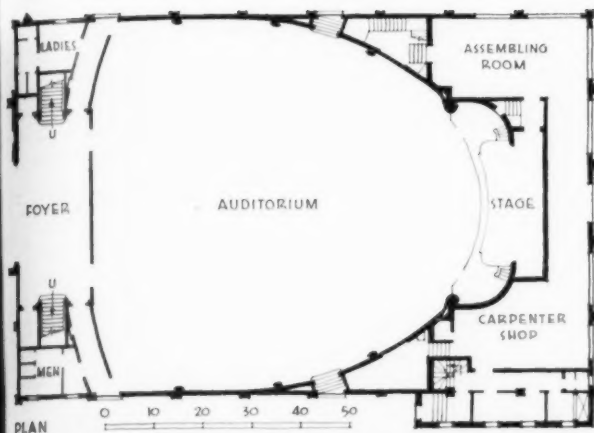




AFTER REMODELING



BEFORE



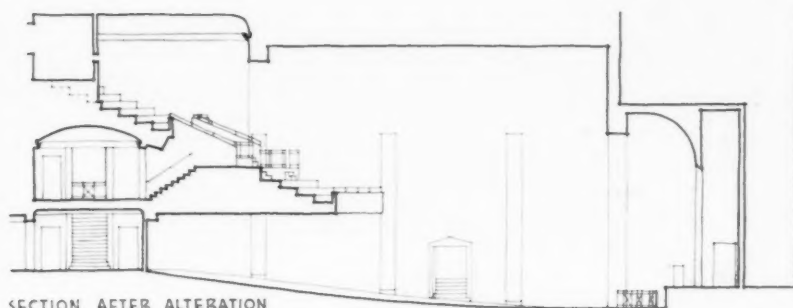
## FLORIDA THEATER IS REJUVENATED

In modernizing Miami's Paramount Theater, Architect **ROBERT LAW WEED** and Charles C. Burton, Consultant, have turned an old-style movie house into a dramatic modern theater. Principal changes were simplification of surfaces and opening up of the foyer-lounge area.

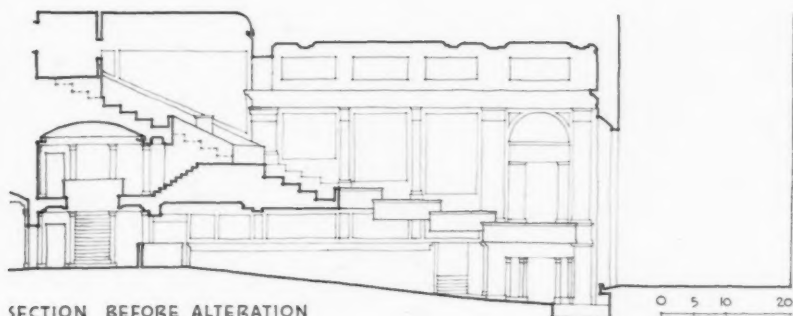
AT THE THEATER ENTRANCE, above the marquee, are three floors of hotel rooms. The desire was to emphasize this entrance area for the full height of the building, yet in no way block out the hotel-room windows. The solution consists of a vertical panel, with adjustable jalousies inserted where windows occur.

The basic plan of the auditorium was changed very little. Its shape and size were fixed, and the sight lines were acceptable. Therefore, remodeling of this area consisted largely of elimination of ornamentation, smoothing of contour lines, simplification of treatment around the proscenium, and installation of new equipment.

Against the side walls of the auditorium, painted a soft beige tint, are white fluted columns, with concealed illumination behind them. These are capped by diverting, life-size dancing figures. The ceiling is gray blue. Around the proscenium, the huge air-brush mural of tropical foliage is executed in white against a vermillion background.



SECTION AFTER ALTERATION



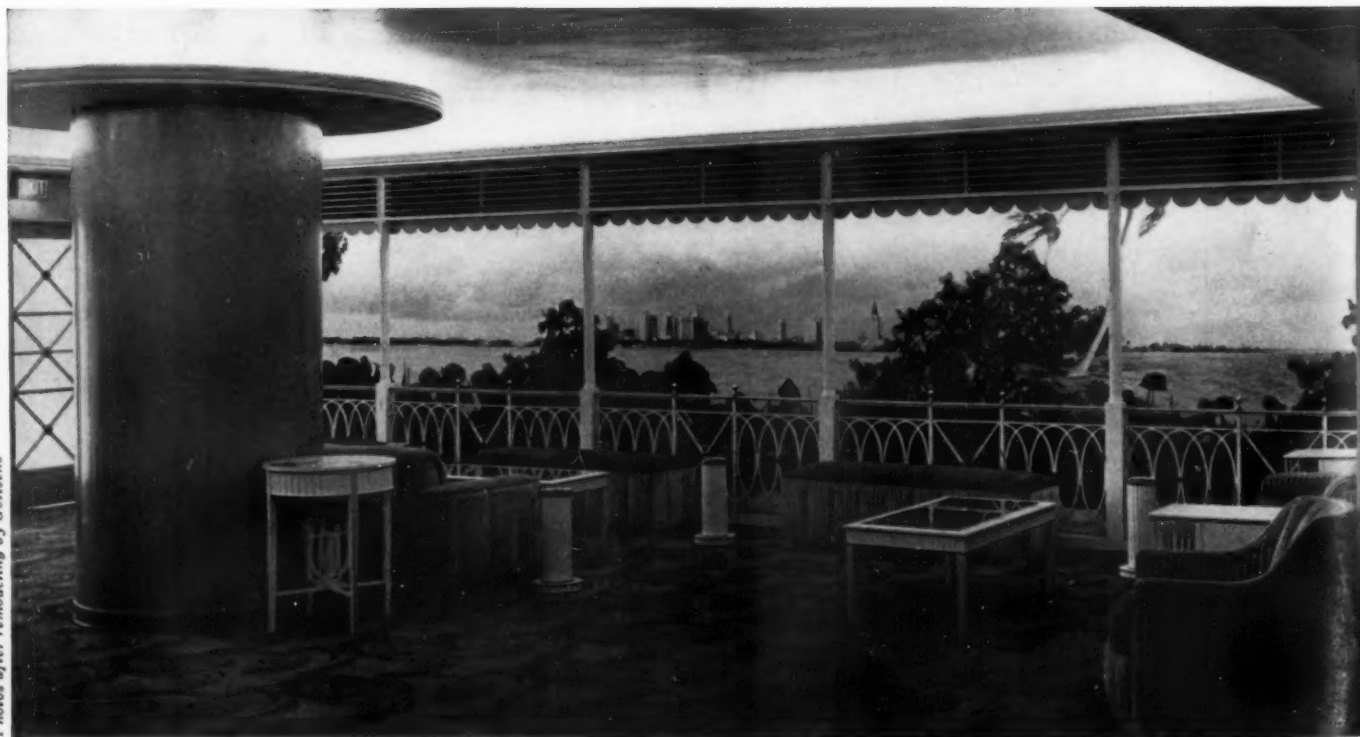
SECTION BEFORE ALTERATION



Balcony foyer

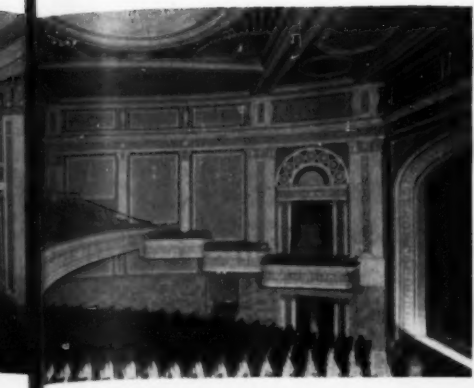


Photomural lounge

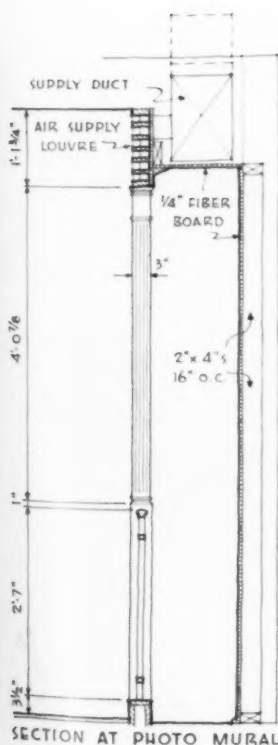


Photos after remodeling by Gottsche





Auditorium



## REMODELED FLORIDA THEATER

ROBERT LAW WEED, Architect

EQUIPMENT HAS been replaced throughout the remodeled theater. Comfortable new modern seating is arranged with an unusual amount of space. The air-conditioning system has been renovated and improved. The acoustical treatment of the auditorium has met the most rigid tests and is complemented by mechanical projection and sound equipment of the latest type. All new lighting is concealed and indirect. Modernization has been extended even to such details as the drinking fountains, which are of the beam-controlled type.

A sizable structural alteration was made in the foyer and lounge area. Previously the lounge was in two parts. Removal of partitions threw these together, forming a single large room. To increase apparent as well as actual space, one wall of the new lounge is surfaced with mirror. Facing this mirror wall is the clever photomural of the Miami skyline shown below on the opposite page. By setting a balcony rail and columns in front of the mural, the surprisingly realistic effect is that of one whole side of the room opening out onto an inviting verandah.

# WHAT'S NEW IN MATERIALS AND EQUIPMENT

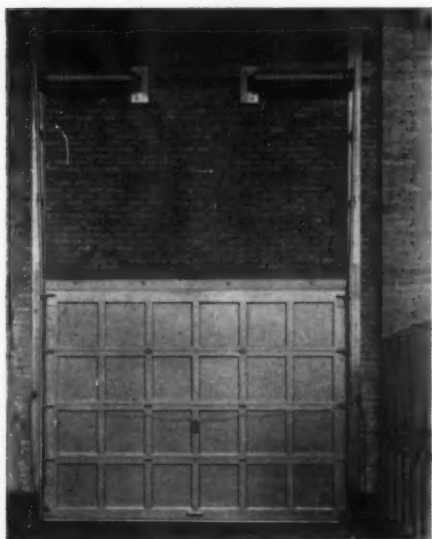


Fig. 1: Spring-balanced overhead door



Fig. 2: Kitchen heater for electric range



Fig. 3: Model CH925 fan-type oil heater

## Spring-Balanced Overhead Doors

A SPRING-BALANCED vertical-acting door for garages, etc., has been placed on the market. Balancing is accomplished by torsion springs coupled to graduated winding drums which, in turn, are attached to the bottom corners of the door by means of airplane cables. The drums are designed in such a way that the lift on the cables remains constant even though the spring unwinds as the door moves upward. Thus it remains in balance in any position. Also, these doors are equipped with a closing action which provides ample running clearance between door and stop when the door is being moved, yet cams the door to a snug fit at the end of the closing stroke. Furnished in sizes up to 16 ft. wide by 7 ft. high, they may be operated by either motor or hand, and hung so that they lie in vertical or horizontal positions when open, depending on the ceiling height. Barber Colman Co., Rockford, Ill. (See Figure 1.)

## Kitchen Heater for Electric Range

DESIGNED TO BE used in conjunction with the manufacturer's electric ranges is this new heater (Fig. 2) which burns either wood or coal. Made with finish and base similar to those of the ranges, it looks like an extension of the latter rather than a separate unit when they are installed side by side. General Electric Co., 570 Lex. Ave., N. Y. C.

## Fan-Type Oil Heaters

RECENTLY ANNOUNCED are two new oil-burning space heaters with specially designed built-in rotors. Known as "Driven-Aire," they are said to provide forced air circulation throughout several rooms. If desired the fan unit may be turned off entirely while the heater is in action. They are finished in brown porcelain enamel and require a flue connection (see Figure 3). Florence Stove Co., Gardner, Mass. (Incorrectly credited AR, 8/40, P. 48, to Wm. B. Remington, Inc.)

## Small Electric Water Heater

THIS INEXPENSIVE 30-gallon electric water heater is a single unit, streamlined and finished in white with a black base. An electric "Carlrod" heating unit is immersed directly in the water

at the bottom of the tank, giving direct heat with a minimum of waste. A built-in automatic temperature control can be adjusted to deliver water between 120-190° F, while insulation around the tank retains heat. As an added economy feature, incoming cold water is distributed by a deflection plate. General Electric Co., N. Y. C.

## Redesigned Steam Trap

ANNOUNCEMENT of the redesign of the Model 69 "Sterlco" float and thermostatic steam trap has been made. According to the manufacturer, it now has greatly increased capacity ranges. Combining float and bellows, the trap is suitable for all steam conditions from 25 in. of vacuum to 20 lbs. of steam pressure. Two inlets and two outlets make possible assembly in a number of different piping arrangements. An easily removable float chamber permits access to operating parts without disturbing piping connections. Bellows are vacuum filled; float valve and seat are stainless steel. Sterling, Inc., Milwaukee.

## Beveled Wallboard

"BESTWALL" IS DESCRIBED as a new gypsum wallboard with all four edges beveled, thus making possible concealed side and end joints. When placed together the depression is reinforced with tape and then covered with a joint finisher, forming a smooth joint. It is also said to save time and labor in application, as it eliminates the "feathering out" that was formerly necessary in finishing wallboard ends. Certain-Teed Products Corp., 100 E. 42 St., N. Y. C.

## Metal Carpet Binding

"CHROMEDGE" No. 770 is described as a patented metal carpet binding which is easy to install. It consists of a top flange which clamps down over the carpet which is then held firmly in place by two special gripper edges, one above and one below. The carpet can be stretched in place and secured by a few hammer blows. The rounded, tapering face of the trim is designed to make it attractive and to prevent people from tripping over it. It is also said to be ideal for runners, as the trim is heavy enough to hold them smoothly and firmly without tacking. B & T Floor Co., Columbus, Ohio.

ARCHITECTURAL RECORD



Heading the September selection of houses is this tradition-inclined house set in a grove of trees near Caldwell, N. J.

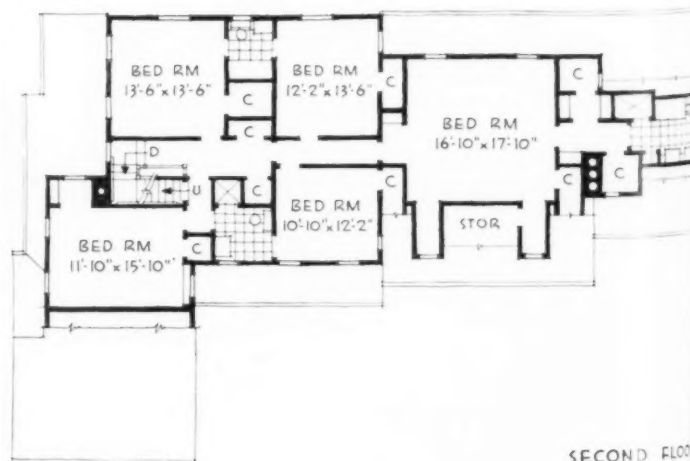
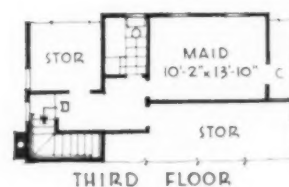
# HOUSES





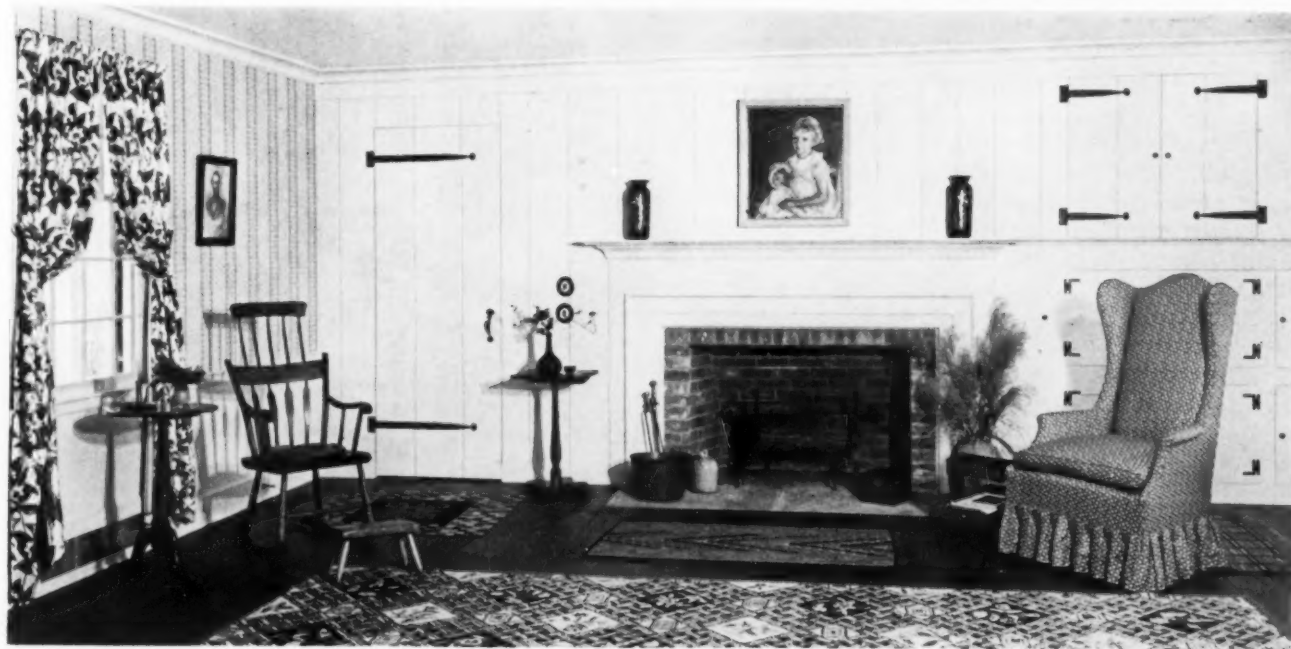
## PLANNED FOR AN ACTIVE SUBURBAN LIFE

For the residence of Mr. and Mrs. Richard L. Scott, in Caldwell, N. J., Architects JOSEPH J. HOOTON and JAMES TIMPSON were required to provide a plan in which individual rooms should have privacy and allow for the simultaneous pursuit of various activities by different members of the family. The clients wanted a house with a rambling plan and low roofs.



THE HOUSEHOLD consists of five persons, all of whom spend a good deal of time in outdoor activity, and also engage in such indoor interests as photography, informal entertaining, and antique collecting. In developing the plan, these activities were all considered. Thus the library, located at the far end of the house, offers a place of retirement when other rooms are being used. Dining and living rooms are large, and, since they are independent of each other, can be used separately. The variety of closet space provided recognizes the need for storing the accessories to the family's hobbies: near the kitchen is a garden-tool room, directly accessible from outdoors; the sports closet is ample enough to care for riding clothes, tennis racquets, etc.; other closets allow for photographic equipment. For accessibility to outdoor activities, five outside doors are placed at strategic points. The terrace connects with living and dining rooms and library, and was placed at the rear of the house because of a view in that direction. The garden, designed by Landscape Architect E. E. Furlong, is on the southeast (front) side of the house. Approximate cost was \$23,000, excluding gardens and walls, which added \$2,500 to the total.

The character of the interior of the house expresses the owners' interest in antiques. The dining room (right) has oyster-white walls and ceiling, with dull blue-green trim and paneling. The living room (below) has papered walls except at the fireplace end.





## L-SHAPE PLAN ADAPTED TO CORNER LOT

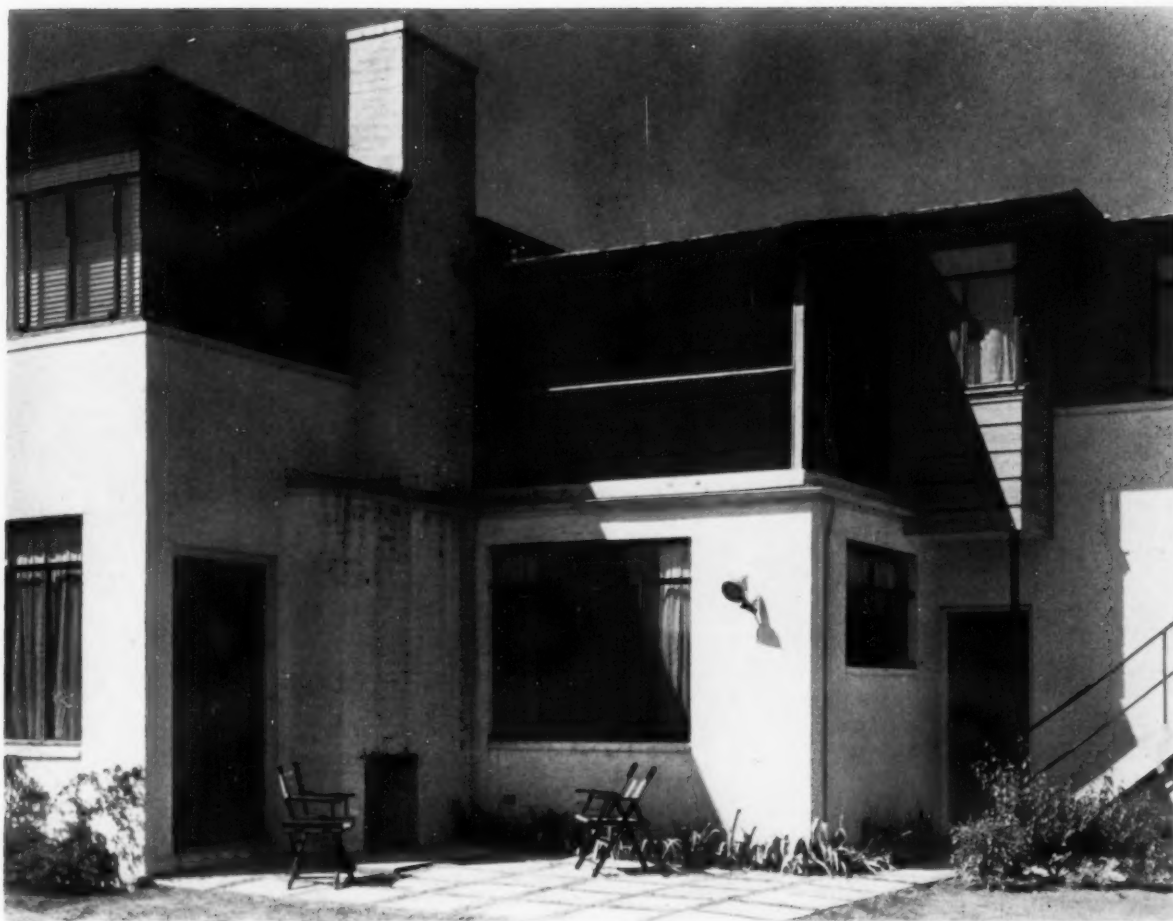
The young couple for whom Architect HOWARD R. MEYER designed this house felt that they probably would not live in it longer than five years. Consequently the plan was developed to meet their present minimum needs. Owners are Mr. and Mrs. Eugene K. Sanger of Dallas, Tex.

INFORMAL LIVING requirements set the keynote of the plan and offered the opportunity of combining living room, dining room, and stair hall. This open L-shaped area gives spaciousness to what would have been three comparatively small rooms had they been partitioned off. Since the house is on a corner lot, with streets on north and west, the L-shape proved a desirable solution for the plan as a whole, giving a maximum of exposed wall and window areas for the living and sleeping areas, as well as privacy for the rear garden. Prevailing summer breezes in this locality are from the southeast, and the main rooms are oriented to take advantage of the winds. The long wall of the living room faces west—a warm exposure during the summer; to reduce heat infiltration but at the same time admit light to the room, the glass-block panel was used. The house is of wood-frame construction, with brick veneer, painted white up to the second-floor windows, and V-jointed shiplap of pine stained gray brown above. The entrance door is of wood painted Indian red. The roof is copper. Interior walls and ceilings are plaster: the south wall of the living room is painted rose, and other walls and ceiling are light beige. Approximate cost: \$7500.

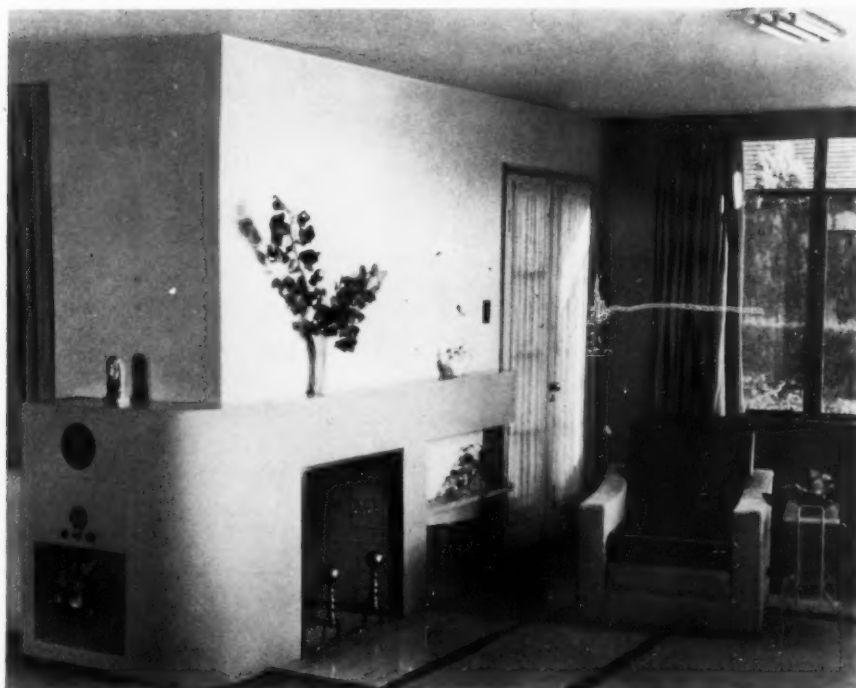


ARCHITECTURAL RECORD





SECOND FLOOR



Living-room fireplace has an outdoor counterpart on the terrace (top).



PLAN



## A SMALL HOUSE THAT HAS THREE BEDROOMS

This house for Mr. and Mrs. Harrison John Overturf in Seattle, Wash., was designed by Architect **GEORGE WELLINGTON STODDARD** and his associates, **HARRISON JOHN OVERTURF** and **WILLIAM HODDER CARLETON**. Mrs. Overturf wanted a colonial house; Mr. Overturf preferred modern. The completed house is a noteworthy synthesis of the two.

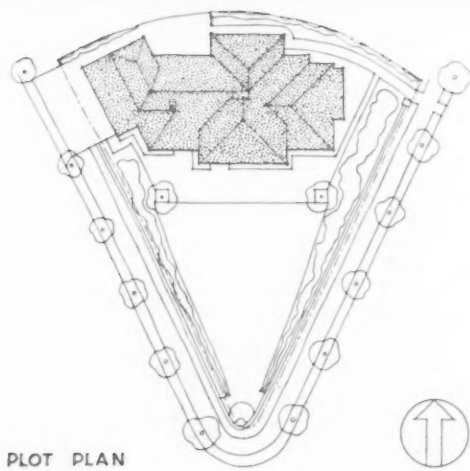
THE RESIDENTS of the house are three in number, two adults and their young son, and their needs led directly to the solution. The living and dining areas are quite open, since neither room is large, and greater flexibility of use is obtained by not defining their limits. The living room looks out toward a view; the dining room, with its unusual bay window, opens onto a fenced-in court. A covered porch at one side leads to the entry hall. Living-room terrace and entrance court are paved with brick, laid in sand. Exterior walls—of shingles and vertical boards, with some flush boards at the gable end—are painted white. The living and dining rooms and the hall have turquoise-blue walls, with wood trim of the same color except in the dining room where it is white. The son's bedroom has plywood walls, painted. Other bedroom walls are papered.



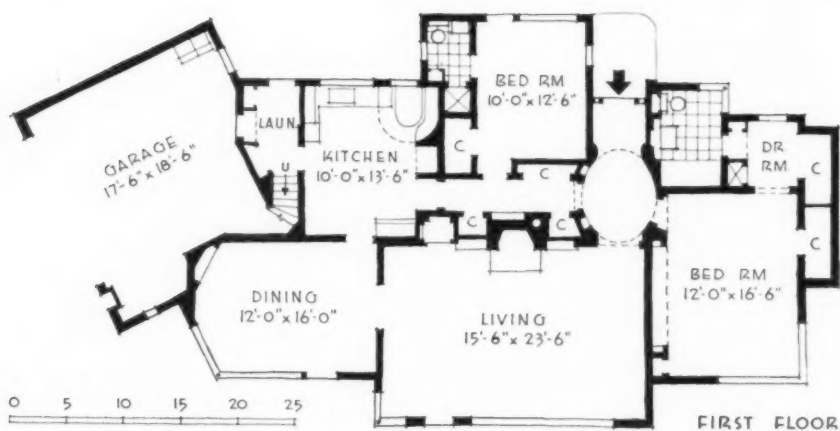
Built-in shelves separate the living room and entry.







PLOT PLAN



FIRST FLOOR

## TRIANGULAR PLOT SETS DESIGN PROBLEM

Privacy, space, and an atmosphere of informal country living were the requirements given to Architect **ANGUS McSWEENEY** by Mr. and Mrs. **A. F. Mattock** for their house in Burlingame, Calif. The irregular shape of the small lot posed an interesting problem and invited ingenuity of solution.

FORTUNATELY the wide part of the lot was to the north, and by placing the house at this end, full advantage was taken of the southern exposure. This location also gave a long sweep of lawn, onto which the main rooms open. The brick wall that encloses the lot affords complete privacy, and the garden actually becomes an extension of the living space. The simple character of the building, with its compact low roof lines, is echoed in the simplicity of landscaping, which is confined to planting along the walls, leaving the main part of the lot open and usable in various ways. The internal planning has a number of features, one of which is the independence of the two first-floor bedrooms. Another is the location of the maid's room over part of the garage. This is actually on a mezzanine level, thus preserving the one-story character of the house.



ATTIC (OVER GARAGE)





Large windows in living room minimize barrier between indoors and outdoors; door leads directly to terrace.



Photos by Sturtevant

The dining room opens off one end of the living room; here also large windows frame a view of the garden.





Compact New York City apartment of Willard B. Golovin. The interior was designed by Virginia Conner, author of this article.

## MAKING MAXIMUM USE OF MINIMUM SPACE

**VIRGINIA CONNER, A.I.D.,** looks at some of the problems connected with interior design of minimum apartments and multipurpose rooms. She both criticizes common faults in the architectural design of these small living areas and suggests solutions to overcome them.

COLLABORATION BETWEEN architect and interior designer is particularly advantageous in planning rooms which are destined for dual use—that is, rooms providing a background for living, dining, and sleeping for one or two persons. Such rooms are not rare; many seek this living arrangement for economic reasons. This does not mean, however, that they want to consider themselves campers. With proper planning two can live in this concentrated space as graciously and comfortably as if they were living in an area with a room for each of their individual needs.

Living in an apartment of this type breaks down into three phases each independent of the other: living-dining-sleeping as one; dressing-bathing-storage, another; and food preparation, a third (Fig. 1). Recognition of these three and their adaptation to the available space is the first step toward a successful one-room apartment.

In the living-dining-sleeping area,

probably the greatest architectural handicap that the interior designer faces is the indiscriminate location of openings. In a one-room apartment these openings are particularly important since every inch of wall space counts. A single entrance should suffice, and preferably this should be located at one corner, resulting in the greatest unbroken wall space (Fig. 2).

The window problem is somewhat different. A small apartment usually has but one exposure. It seems to me that every inch of this limited frontage should be utilized by providing one large glazed area for a maximum amount of light and air (Fig. 5). By eliminating the stock window or windows placed in the wall without rule, the architectural appearance would be greatly benefited.

This arrangement of three unbroken walls (one glass) and the fourth with only the entrance leaves the interior designer with little to be desired.

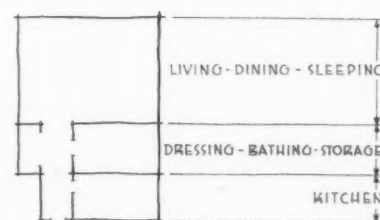


Fig. 1

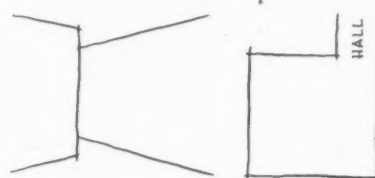


Fig. 2

## MULTIPURPOSE UNITS

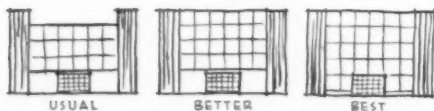


Fig. 3

Fig. 4

Fig. 5

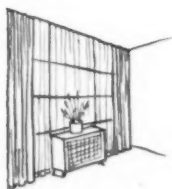


Fig. 6

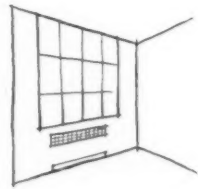


Fig. 7

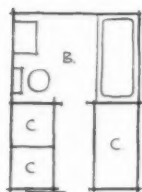


Fig. 8

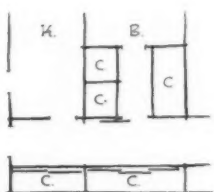


Fig. 9

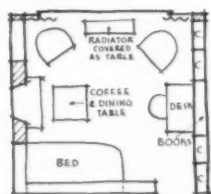


Fig. 10

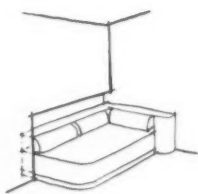


Fig. 11

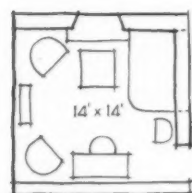


Fig. 12

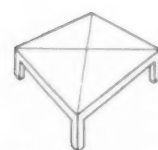
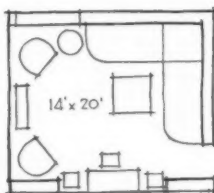


Fig. 13

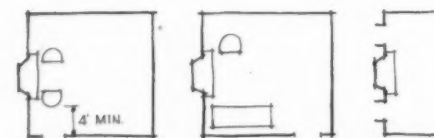
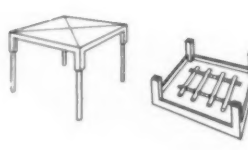


Fig. 14, at left: clearance behind furniture. Center: the ideal location. Right: difficult to furnish

THE PARTICULARLY baneful feature in designing interiors is the radiator (Figs. 3, 4, 5). In the case of a ceiling-to-floor window, if the radiator is set far enough into the room to allow clearance back of it for blinds and curtains, the problem is partially answered. Radiators can be covered and considered as a piece of furniture (Fig. 6), even perhaps combined with a piece of furniture. In old buildings with projecting radiators under the windows, curtain treatments are almost more for a magician to cope with than the interior designer. For the shorter window, radiators set flush with the wall below (Fig. 7) are most practical, in my experience, for they allow complete freedom for curtain arrangements.

My idea of the ideal bath-dressing-room unit provides wardrobe closets on the passage to the bath (Fig. 8). The closet area will then be accessible to both sections of the apartment—these closets to consist of built-in wardrobe drawers, hanging and hat space, shoe shelves, and miscellaneous shelves. The space above, out of reach, can house the things not used every day; such as, out-of-season clothes, blankets, and suitcases. Many additional storage closets can be furnished on the main entrance passage wall (Fig. 9). One will be needed for guests' coats and hats, and one for golf clubs, skis, guns, fish rods (or whatever it is). If there is no kitchen storage space, cleaning supplies, laundry and ironing equipment may of necessity have to bury themselves in this departmental closeted passageway.

There is little to be said of the third phase of living in this apartment—cooking—since the size of the kitchen depends so completely on the conditions of the building. I can only breathe the hope that it be kept as large as possible and that if it is a wall kitchenette, it be kept out of the living area and the entrance passage. I feel strongly about the latter—having floored a maid with a tray full of cocktails as I entered an apartment of the hall-kitchenette plan.

In mapping out a room for living, sleeping, and dining (Fig. 10), it is well to allow 1 ft. around the perimeter of the room for the incorporation of built-in details. In many cases structural corner breaks may not only determine this depth but they may be worked into the room design. These built-in features may include a sofa-bed back and head ledge, light niches, book cases, shallow drawers, and closets—the introduction of each to be made a

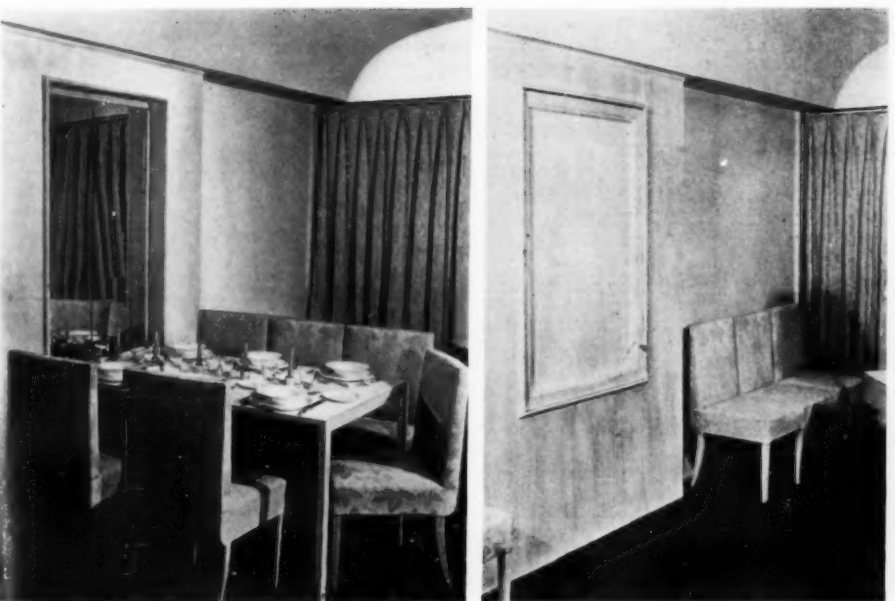
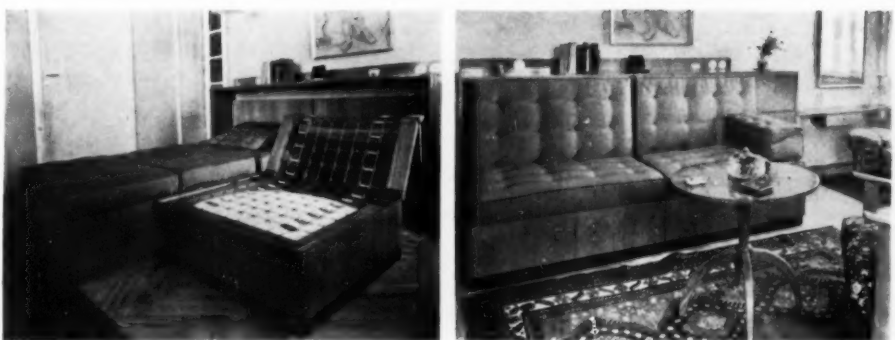
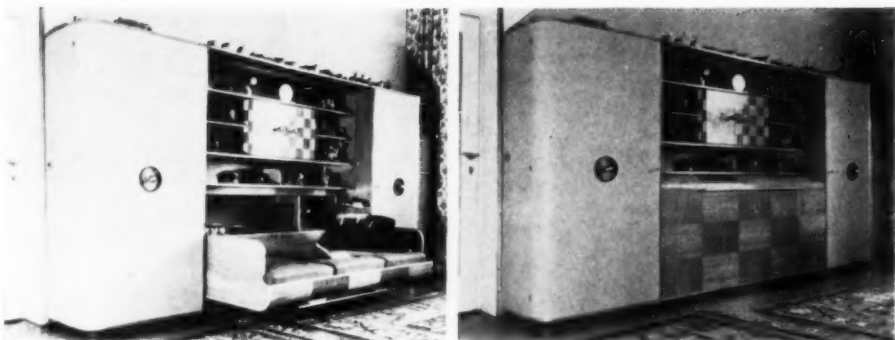
part of the room design.

While most people who live in such an arrangement are more or less transients, their natural desire is to live in an atmosphere of permanence. It is no fun for them to move chairs and furniture and to make up a bed each night. For this reason where the furniture must fulfill more than one purpose (the bed must also serve as a sofa by day, the desk must offer space for study as well as drawers for storage, etc.), the functions of each piece of furniture must be considered. If each living section is provided with two box-spring-and-mattress type bed sofas, this will offer ample seating space, as well as adequate sleeping accommodations. By use of a boxed bed spread on each of these sofas, the nightly operation of making up a bed from scratch can be avoided. Wider springs and mattresses can be used without taking up any greater area in the room if a back ledge of table height with a reveal below is provided (Fig. 11); during the daytime the bed width can be partially absorbed by sliding it into the reveal.

The room will consist of a number of living sections, each computed on the basis of the purpose to be performed therein. To determine these areas, governed by the size of the furniture, it is well to remember the minimum space required for comfort and the function of each piece (Fig. 12). For example, the sofa bed should be not less than 3 ft. 6 in. by 6 ft. 6 in. and stand 17 or 18 in. high.

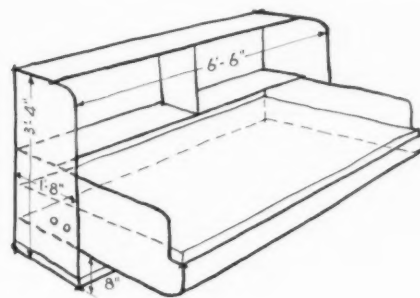
The dining table can easily be incorporated as a panel in the wall to drop out and be supported on folding legs (opposite page, at bottom.) A width of 36 in. allows ample table setting on each side. The length, of course, depends on the room height and the free area to receive it into the room. A large coffee table can do double duty as a dining table as well if the legs are equipped with extension rods (Fig. 13). A square 36 in. is minimum for comfort. Two sets of extension legs can be made—one to bring the table to the right height for use near the sofa-bed or longer rods for dining height. This type of table can also be made to extend.

To me, the fireplace, although no longer essential from a functional point of view, still keeps its importance as a gloom chaser and decorative note in the room. Great thought should be given to its placement to permit a comfortable seating arrangement (Fig. 14). Otherwise it becomes a superfluous opening.



## F. M. GROSS and PAUL BAMBERGER Designers

AT LEFT ARE two variations of the fold-away bed shown in the sketch below. The bed, which turns on a metal pivot, is counterweighted at the rear in such a way that no leg supports are necessary. When opened, a pair of bedside shelves and a bedding storage compartment are revealed within the cabinet.

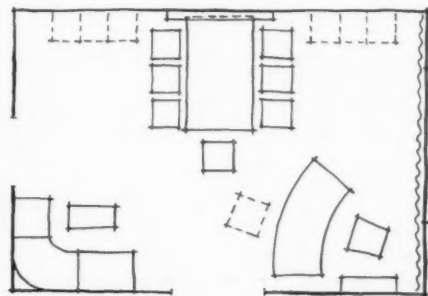


## PAUL BAMBERGER, Designer

THIS SETTEE bed, designed for a small apartment, is made in three hinged sections. The front section, also used as a chest for the storage of bedding, slides out on casters. When closed, the two rear cushions form the settee back. The cabinet work is of cherry, with a recessed base of linoleum.

## PAUL BRY and JO KIM, Designers

PLANNED FOR a room serving as both a study and dining room, this wall table takes up minimum space. The dotted lines on the plan below show the placement of chairs when the table is not in use. The recess is lined with mirror, doubling apparent size.

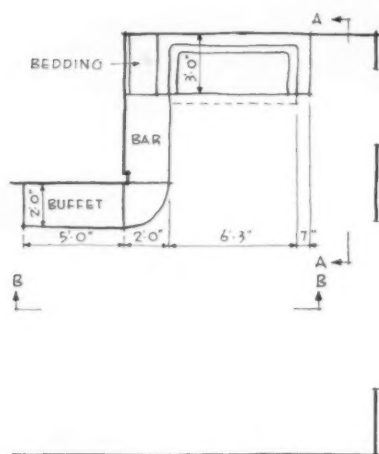




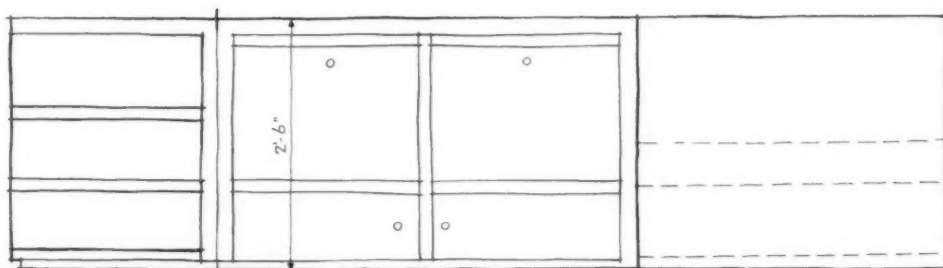
# MULTIPURPOSE ROOMS

**PAUL BRY  
and JO KIM  
Designers**

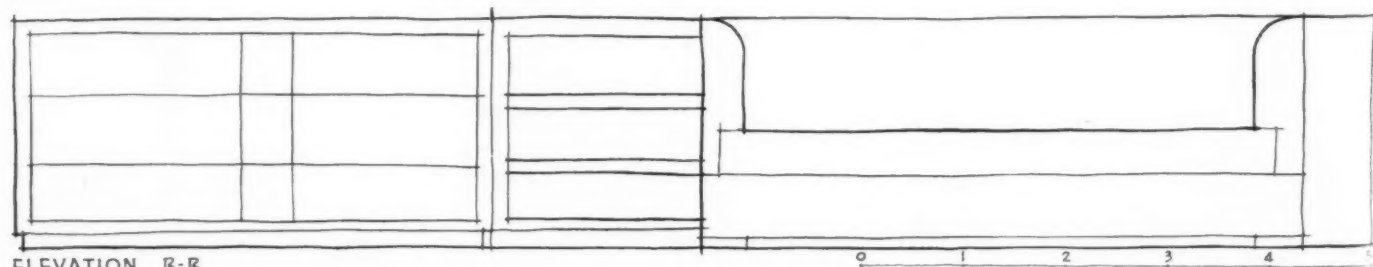
LOUNGING, sleeping, and entertaining functions are combined in this compact alignment, which follows the angle produced by a projecting wall. At the head of the sofa-bed is a storage case for bedding. In front is a cabinet with a pair of doors, hinged at the bottom, which, when let down, serve as a bar. The compartment lining is of white plastic veneer. At the corner is a quadrant bookcase, and the series terminates with a generous buffet cabinet. The units are made of oak, sandblasted and waxed. The sofa is upholstered in quilted, pale almond-green chintz.



PLAN



ELEVATION A-A



ELEVATION B-B

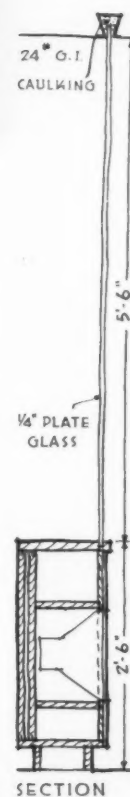
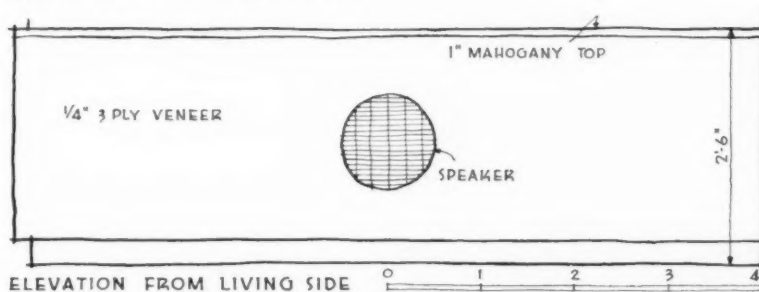
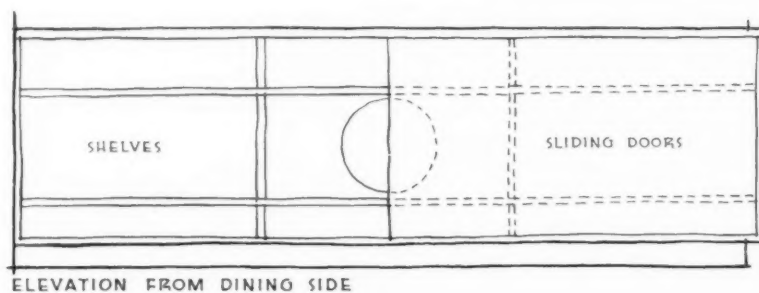
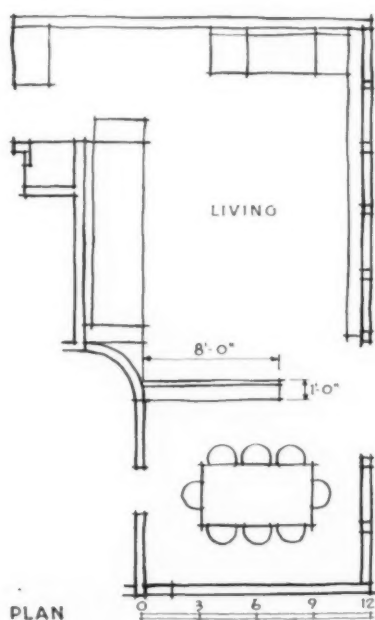
ARCHITECTURAL RECORD

**RAPHAEL S. SORIANO**  
Designer

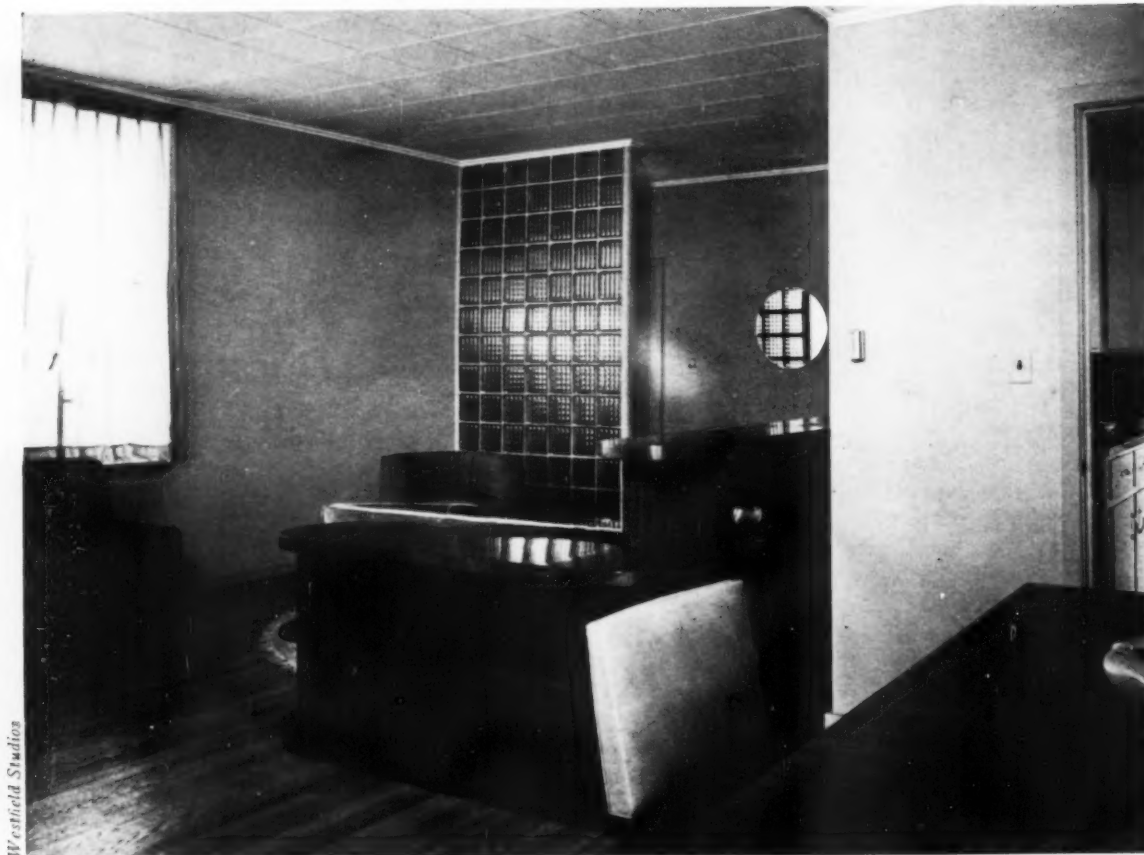
THE DINING and living areas of this room are separated by a table-height buffet, topped by a peach-colored plate-glass panel, extending to the ceiling. The buffet unit also serves as a baffle board for a phonograph and radio loud-speaker, which opens into the living area. The mahogany buffet top matches the dining-room table. The cabinet case and the walls of the room are both of  $\frac{1}{4}$ -in. ailon-surfaced plywood. The carpet is blue; draperies are of canary-yellow corduroy.



Julius Shulman



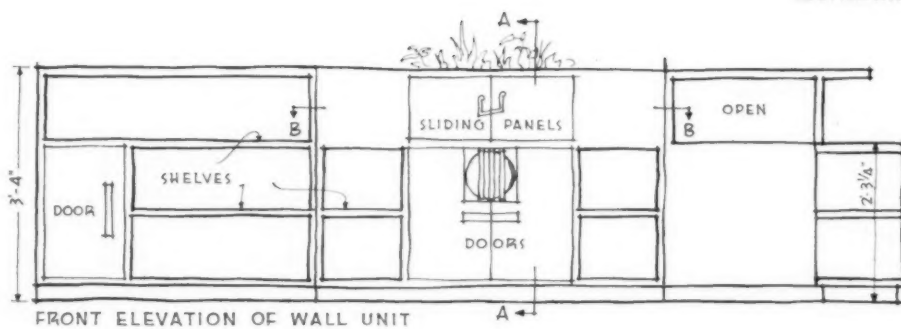
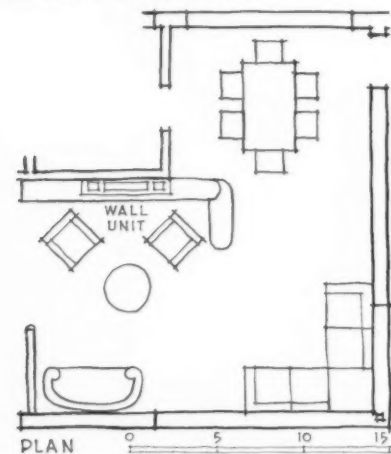
## MULTIPURPOSE ROOMS



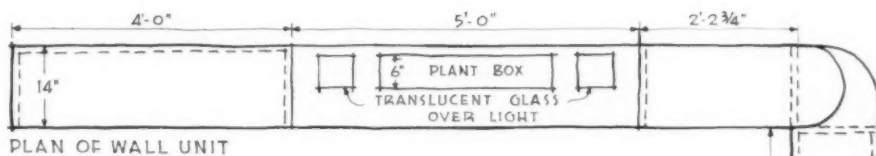
Westfield Studios

### HARRY MASLOW, Architect

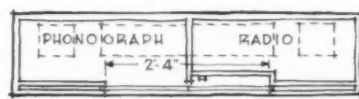
THE PHOTOGRAPH shows the bar end of a multipurpose cabinet, surfaced in walnut veneer, which divides living and dining areas. On the living-room side are cupboards, shelves, radio and phonograph case, and a plant box. The unit was specially designed to provide ample facilities for entertaining in a small house. The glass-block panel in the background shields the front door.



FRONT ELEVATION OF WALL UNIT



PLAN OF WALL UNIT



PLAN B-B



SECTION A-A



# A progress report on RADIANT HEATING AND COOLING

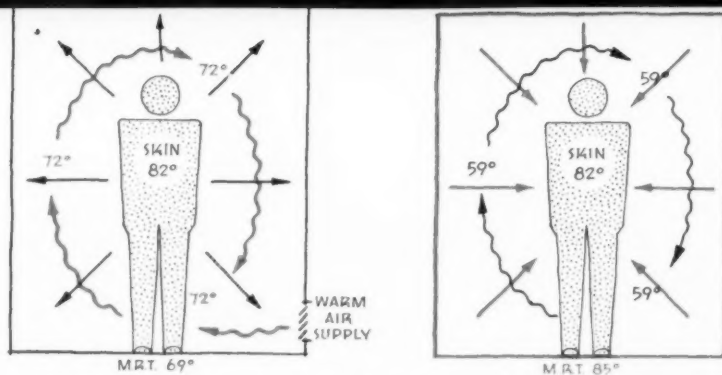


Fig. 1: HEATING. The man on the left is kept comfortable by air that is slightly cooler than the temperature of his skin; the man on the right is kept comfortable by surfaces whose mean radiant temperature is slightly warmer than his skin. In either case, the heating system maintains the optimum transfer of waste heat from body to environment, irrespective of outside winter conditions.

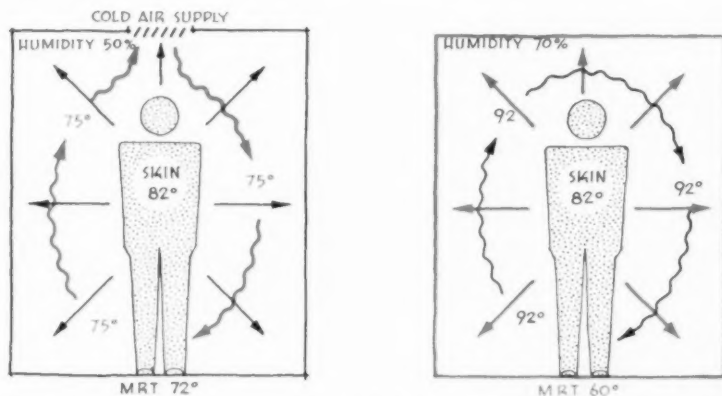


Fig. 2: COOLING. The man on the left is kept comfortable by losing surplus body heat to air which is cool, dry, and in movement—i.e., conditioned; the man on the right is kept comfortable by losing surplus body heat to surfaces which are cooler than he, even though air temperature and humidity are both high. In either case, the cooling system maintains the optimum transfer of waste heat from body to environment, irrespective of outside summer conditions.

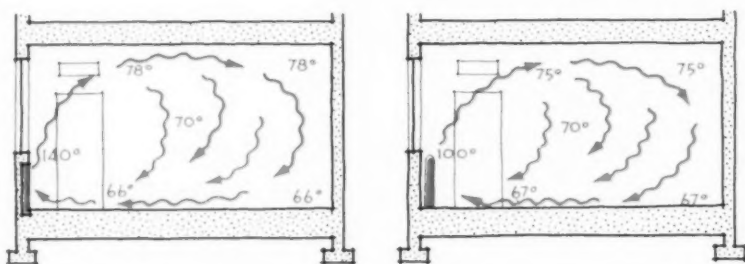


Fig. 3: CONVECTION. Temperature distribution in average rooms with warm-air system (left) and steam radiator (right)

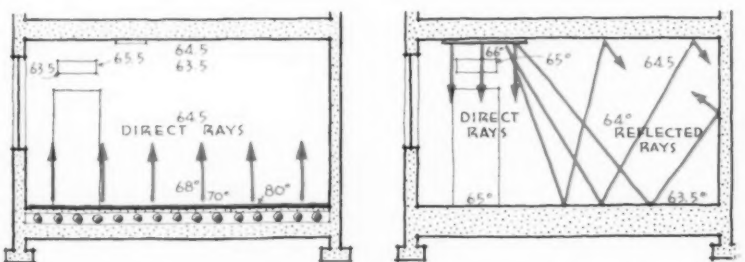


Fig. 4: RADIATION. Temperature distribution in rooms with heated floor (left) and heating panel in ceiling (right)

Fig. 5: Types of Radiant Systems Classified by Heat Medium

HEATING			COOLING		
HEATING MEDIUM	DISTRIBUTION METHOD	SOURCE OF HEAT	COOLING MEDIUM	DISTRIBUTION METHOD	SOURCE OF COLD
1. WATER	Pipe Coils	Coal, Gas, Oil Electricity	1. WATER	Pipe Coils	Standard Refrigeration
2. STEAM	Pipe Coils	Coal, Gas, Oil			
3. AIR	Cellular Floors and Walls, Unit Heaters, Distributors	Coal, Gas, Oil	3. AIR	Cellular Floors and Walls, Unit Heaters, Distributors	Standard Refrigeration
4. ELECTRICITY	Resistance Coils Reinforcing	Electricity			

To be warm in winter with windows wide open; to be cool in summer with air temperatures in the 90's; to have one's feet as warm as one's head in winter; to have no sense of shock in summer when entering a cooled restaurant from a torrid street—these are some of the advantages claimed for the radiant method of heating and cooling. Upon what principles are such apparent paradoxes based? Where are such systems being installed? By whom? How? . . . To answer these and similar questions, the RECORD herewith surveys the field.

TODAY, the term air conditioning is generally understood as including control of air temperature, humidity, movement, and purity (freedom from dirt, odors, bacteria); in certain highly specialized applications, even pressure and chemical composition are controlled. (See AR, 6/39, pp. 68 and 7/39, pp. 70.) Radiant or panel heating and cooling can directly effect only surface temperature and indirectly air movement and humidity. Thus the two systems cannot be equated; air conditioning includes control of all atmospheric factors, while radiant heating controls only the thermal. But with this latter phase of air conditioning and with all other conventional types of heating, radiant heating and cooling may be fairly compared—physiologically, mechanically, and structurally.

Mechanically, present radiant heating systems in this country and Europe differ from all conventional systems in only one important respect—the actual method of heat transfer. They use the same heating media—water, steam, air, and electricity; they are assembled from the same equipment—boilers, piping, controls, etc.; they depend upon the same fuels—coal, oil, gas, electricity—and employ the same principles of energy-to-heat conversion. The basic difference is that one maintains human comfort by controlling the temperature of surrounding surfaces while the other does it by controlling the temperature of surrounding air mass.

## What is radiant heat?

The surfaces of all bodies whose temperatures are higher than  $-460^{\circ}$  F. are known to radiate energy. The nature of this radiant energy is not completely understood but wave lengths of from 4000 to 400,000 angstrom units are known as *radiant heat*, because this radiant energy—when intercepted by a body—is partially transformed into heat. Such heat is radiated from every point of every surface, in all directions, and (like light) flows in straight lines, at high speed—186,000 m.p.s.: like light also it may be focused or

## RADIANT HEATING AND COOLING: Types using WATER or STEAM as medium

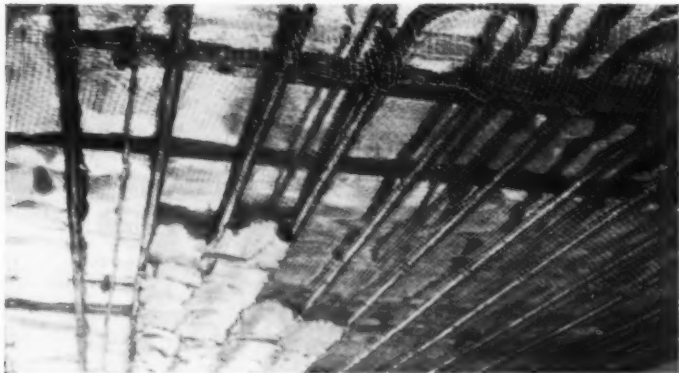


FIG. 6: This installation in an Illinois house uses hot water as heating medium. Prefabricated steel coils are imbedded in three-coat reinforced plaster (right, above). A combination relay and attack switch and two immersion-type aquastats, one for control (set at 190°) and one for a high-limit cut-off, are used. A 2-in. booster pump on a separate switch driven by 1/6 h.p. motor operates continuously during the heating season. Water temperature control and circulation are provided for by an electrically controlled mixture of water from the boiler and recirculated water. The maximum water temperature in the system is set at 130° F, controlled by a valve which operates from an indoor-outdoor thermostatic control. . . . Each coil throughout the house is controlled by a

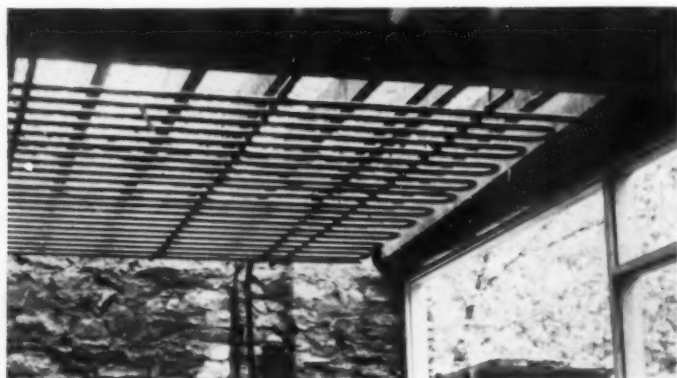
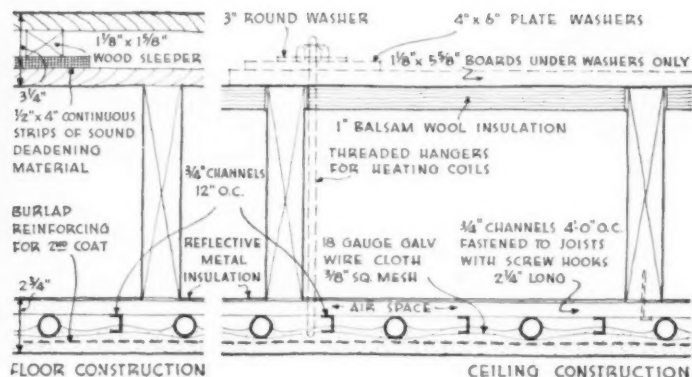
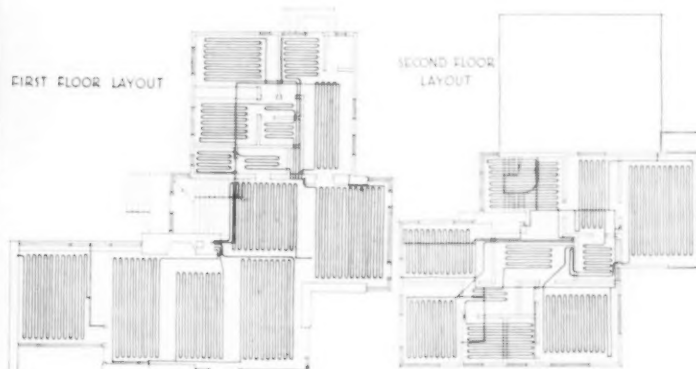


FIG. 7: This Connecticut house uses ceilings heated by prefabricated steel pipe coils of patented design. Coils are hung from structural floor, semi-imbedded in reinforced plaster similar to Fig. 6. Heating medium is water at 130°, circulated under pressure. Diagram at right



shows layout of ceiling coils: note central location of risers, orderly disposition of coils. BREINES and POMERANCE, Architects; WOLFF and MUNIER, Inc., Heating Engineers, using patented system licensed by Richard Crittall & Co., Ltd., of London, and Wolff and Munier, Inc.

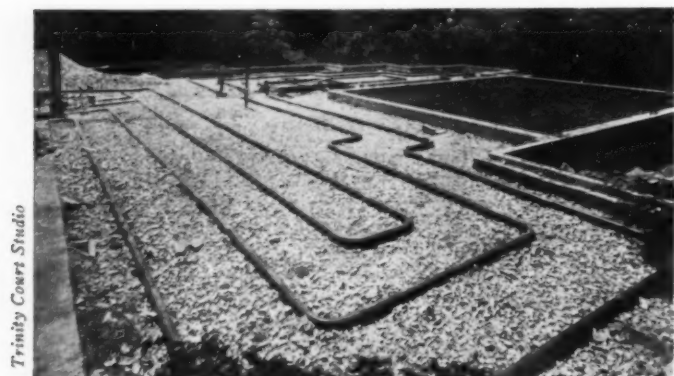


FIG. 8: Prefabricated 2-in. wrought-iron coils imbedded about halfway between top and bottom of a 9-in. coarse-gravel fill in a new Missouri house. This is topped with a reinforced-concrete mat and finish floor. Heating medium is 130° water. FRANK LLOYD WRIGHT, Architect.

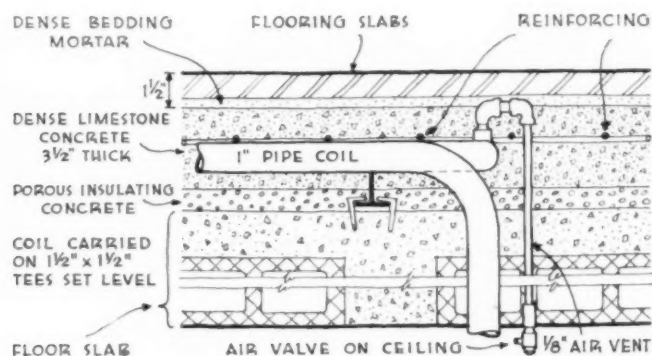


FIG. 9: Built in 1928, the radiant-heating installation in this Pittsburgh church employs 10-lb. steam in welded wrought-iron pipe coils imbedded directly in concrete floor. Note that reinforcing mesh is placed directly on coils. CARLTON STRONG and KAISER, NEAL & REID, Architects

reflected and is little affected by atmosphere. Although for practical purposes radiant heat may be said to have the property of flowing from hot to cooler surfaces, this flow is in fact never unidirectional since *all* bodies above absolute zero radiate heat. The heat exchange process may therefore be compared to a multilane highway, with the preponderance of traffic flowing from the warmer body towards the colder one.

Intensity of thermal radiation depends on the temperature of the source (proportional to the 4th power of the absolute temperature) and on the color, nature, and surface condition of the source. Conversely, the amount of heat absorbed by a body in the path of radiant energy depends on the color, nature, and surface condition of the body. Thus, a black body absorbs radiation readily while a polished metallic surface reflects it.

#### Radiant cooling

If a man to whom heat is radiated is described as being *radiantly heated*, then a man who loses heat to a surface cooler than himself may be described as *radiantly cooled*. Recent experimental installations indicate the possibility that radiant installations using hot water or hot air as a *heating medium* in winter may use cold air or cold water as a *cooling medium* in summer (Fig. 5).

#### Heat and the human body

The human body produces heat by a process called metabolism; and the amount of heat produced varies very widely according to activity and age (a man engaged in violent exercise may produce ten times as much heat as he will when in bed and asleep, while a ten year old produces more heat than an elderly man). But the body is only about 20% efficient in the performance of muscular work, which means that—under ordinary thermal conditions—approximately 80% of this heat is waste and must be dissipated, since the body is very sensitive to its accumulation. Thus, according to C-E. A. Winslow,\* “the fundamental requirement for comfort is that the total net heat loss from the body by convection, radiation, and evaporation shall balance the heat produced in the body under given conditions of muscular activity.”

Within fairly narrow limits, the body has an extraordinarily efficient system for balancing heat production and heat loss to achieve a constant body tempera-

ture of 98.6°F; only when external or internal conditions send it above 105°F or below 80°F, do collapse and death ensue. To achieve this balance the body relies upon three principal means of heat transfer—convection, radiation, and evaporation. (Except for swimming or bathing, conduction operates only accidentally and may actually have deleterious effects.) Each is physiologically effective within given limits, although evaporation by sweating becomes uncomfortable long before it ceases to be effective. Thus, mechanical equipment for control of man's thermal environment is for all practical purposes confined to convected and radiant means.\*

Discussion of control of the thermal environment is considerably facilitated if three facts are borne in mind:

- (1) Thermodynamically, *there is no such thing as cold above absolute zero, minus 460°F—only varying degrees of heat.*
- (2) Heat transfer from a body to its environment may occur in any or all of four ways—convection, radiation, conduction, and evaporation.
- (3) Physiologically, the human body is neither “warmed up” nor “cooled off” by its environment. Rather, under a given condition of muscular activity, the rate of heat loss from the body is merely *slowed down or speeded up* by changes in its thermal environment.

#### Physiological effects of radiant heating and cooling

Most people have had the experience of sweating on a sunny winter day when the temperature is below freezing and the ground deep in snow; or of feeling very comfortable in the summer in interior rooms with thick masonry walls. In either case, they have experienced the phenomenon of radiant heat. But numerous recent experiments under controlled conditions indicate that transfer of heat by radiant means can be duplicated indoors to definite advantage. The Pierce Laboratory has found that reclining subjects were perfectly comfortable in air at 50°F if radiantly heated by walls with a temperature of 110°F. At the other extreme, Mills and Ogle have found that human subjects were comfortable in air at 92°F and relative humidity at 70%, when radiantly cooled by six “cold plates” at 32 to 40° on two opposite walls (See also Fig. 1 and 2).

\*This is of course only relatively true, since nowhere in nature are there conditions which permit the transfer of heat by one means exclusively. Thus, the term *heating by radiation* implies *heating by preponderantly radiant means*.

These experiments indicate that human comfort can be attained indoors *without the sharp differentials between indoor and outdoor temperatures and humidities associated with conventional heating and cooling systems*. This is important physiologically. “Respiratory infections, which form the great bulk of human illness in stormy regions, seem definitely related . . . to sudden changes in temperature”, according to Mills and Ogle†; while Winslow‡ feels that “there can be no doubt that real injury to health must have resulted from the very sharp contrasts between air-conditioned trains and the outside atmosphere in the early days of the practice.”

Another physiologically important criterion of a heating system, according to the British Industrial Fatigue Research Board, is that it should provide an *air temperature at the level of the feet equal to or greater than that at the level of the head*. Recent tests seem to indicate that this criterion is more nearly approached by radiant means than by conventional types (Figs. 3 and 4).

Since outside humidities are ordinarily low in winter and high in summer, the conventional systems are mechanically equipped to *raise* them in winter and *lower* them in summer—the latter being, of course, the greater problem of the two. Winter heating by radiant means permits higher humidities as the result of lower air temperatures. Summer cooling by radiant means gives comfort even when humidities are high. At high temperatures sweat does not evaporate rapidly enough for comfort if humidity is also high; but if body heat loss by radiation is rapid enough, there will be no need for sweating; hence, comfort without dehumidification.

#### Combined radiant heating and cooling systems

One theoretical advantage in radiant heating installations using hot water or air as a medium is that—like air conditioning—the system can be “reversed” in summer by circulating cooled water or air. In actual fact, however, such a reversal is always limited by condensation problems—i.e., by the relationship between air temperature, relative humidity, and dew point. In a room with an air temperature of 90°F and a relative humidity of 50%, the walls could

\*Professor of Public Health, Yale University School of Medicine; Director, John B. Pierce Laboratory of Hygiene.

†“Control of Body Heat Loss Through Radiant Means”, by C. A. Mills and Cordelia Ogle, *Heating, Piping, and Air Conditioning*, November 1937.  
‡“The Air-Cooled Human Body”, *Heating, Piping, and Air Conditioning*, April 1940.



## RADIANT HEATING AND COOLING: Types using WATER or STEAM as medium

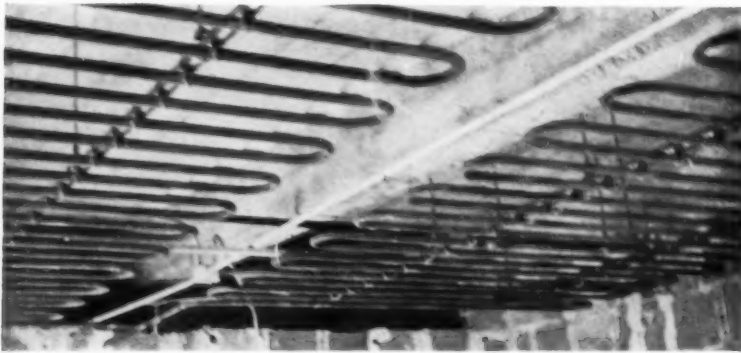


FIG. 10: This year-around radiant heating and cooling system in an Everett (Wash.) high school uses prefabricated steel coils embedded in plastered hung ceilings. Heating medium is water under forced circulation with maximum temperature of 130°F. Cooling medium is city water available at 62°F. Since dew-point of outside air in this region never exceeds 60°F, and outside dry bulb seldom goes over 90°F, radiant cooling is possible without condensation on ceiling. EARL W. MORRISON, Architect; ERWIN L. WEBER, Heating Engineer, using system licensed by Richard Crittall & Co. and Wolff & Munier, Inc.



FIG. 11: Use of radiant heating and cooling to supplement year-around air conditioning is employed in this Des Moines office building. Exterior walls are raised only to approximately 70°, the rest of the heating load being carried by the air-conditioning system. Similarly, in summer, the temperature of the walls may be reduced, the majority of the cooling load being again borne by the air conditioning. Continuous coils of 1-in. i.d. copper tubing on all exterior walls are mounted in front of 2-in. cork insulation and covered by prefabricated metal wall panels. TINSLEY, McBROOM & HIGGINS, Architects; CHARLES LEOPOLD was the Heating and Ventilating Engineer.



FIG. 12: One of the few "reverse-cycle" installations in the country, this system in an Idaho residence uses a standard compressor operated by a 3/4-h.p. motor for both heat and cold. Heat is distributed by means of a network of copper tubing imbedded in the plaster and backed up by reflective foil sheets and 3-in. mineral-wool bats. Cooling is by usual means of forcing air over a coil (although owner now regrets that system was not designed for radiant cooling as well). Coefficient of performance of the system during the past heating season was 3.4; electrical energy consumed totaled 5337 kwh or 1.1 kwh per degree-day heating for the six-room structure. CLARENCE E. BOGGS was designer of both the house and heating system.

### Variations of WATER or STEAM types

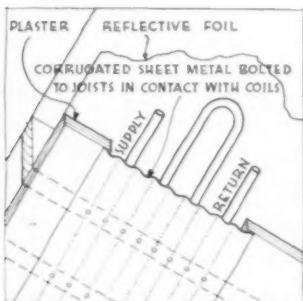


FIG. 13: Here corrugated sheet iron is bolted directly to coils providing easy access, good heat distribution, decorative surface.

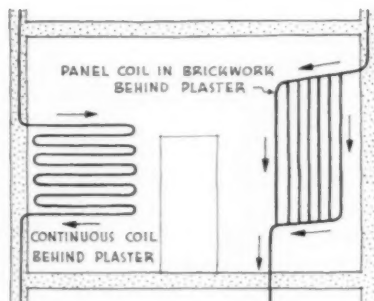


FIG. 14: Two English variations of panel heating in walls. Here the coils are imbedded in plaster in fashion similar to that shown in Figs. 6 and 7.

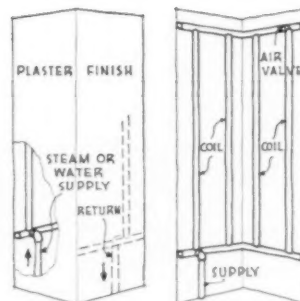


FIG. 15: Possibility of using columns as radiant surfaces. With proper temperatures, finish could be either plaster or metal.

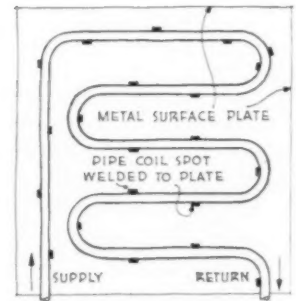


FIG. 16: Metal plates welded directly to coils serve as excellent distributors for either radiant heating or cooling.

be cooled to 69°F without condensation, in which case the body would lose substantial heat to the walls. However, if the humidity rises to 65%—the air temperature remaining 90°F—the walls could only be cooled to 77° without condensation; and the sense of comfort would be correspondingly smaller. This indicates that the year-around use of combination radiant heating and cooling installations is limited to those situations: (1) where summer humidities are low (Fig. 11); (2) where walls are merely cooled to near dew point as an aid to the air-conditioning system (Fig. 10); (3) where the cooling panels are supplemented by dehumidification equipment which can "process" the air to any desired degree of dryness.

However, radiant cooling panels not imbedded in floor or ceiling can effectively maintain human comfort under high temperatures and high humidities. The only mechanical provisions required are for handling condensed moisture. Such cold plates show great promise in specialized applications such as hospital operating rooms, where patients should be warm and surgeons cool. An experimental operating room in a midwestern hospital has been foil lined and equipped with two free-standing cold plates on opposite walls of the room, so placed that the staff is exposed to the "beam" while the patient is not. With temperatures up to 92°F and humidity up to 60%, the staff was quite comfortable with the cold plates at around 50°F.

#### Performance levels of radiant systems

Performance levels required of radiant systems are most easily expressed in terms of *comfort zones*. A comfort zone (for male adults at rest and clothed in three-piece suits) has been established by Dr. C. P. Yaglou at Harvard at these three levels:

Air temperature	Mean radiant temperature
71F.....	71F
63F.....	79F
59F.....	85F

Design of all radiant systems is based upon the same central principle, and calculations are in fact similar to those underlying convection systems; but accurate calculation of variable factors as yet depends upon procedures beyond the scope of this paper.\* Meanwhile,

\*For detailed information on procedure see "Radiant Heating," p. 715, 1940 ASHVE Guide; also "Radiant Heating and Cooling", by F. E. Giesecke, *Heating, Piping, and Air Conditioning*, June, July, August, 1940.

panel heating installations throughout the country are already proving satisfactory with relatively no standardization in design, installation or operation.

#### Basic types of installations

Although variations of radiant heating and cooling are already numerous and constantly increasing, they are best classified according to the heating or cooling medium employed—water, steam, air, or electricity for heating; water or air for cooling (Fig. 5).

Of these, the types using *water* or *steam* are as yet the most important. Although the surface temperature of ordinary steam-heated panels makes them practical only for ceilings, either the use of high-vacuum steam or turbulent intermixture of air and steam can be used to reduce surface temperatures. The basic heating element here is naturally a pipe coil imbedded in the floor, wall, or ceiling (Figs. 6 to 16). The interesting possibility of using such coils as reinforcing for concrete floor and ceiling slabs has already been raised and experiments along this line are under way at the Agricultural and Mechanical College of Texas.

Types using *air* as a heating and cooling medium are apparently little known in this country but in fairly wide use abroad. Remarkable results are said to have been obtained by forcing hot air through closed circuits in cellular floors (Fig. 22). In use in France is a system employing concentric nozzles whose jets of hot or cold air are so directed as to heat or cool ceiling surface by direct contact (Fig. 20). A variation in this country has been the proposed use of unit heaters in similar fashion (Fig. 21).

All ordinary *electric* heaters are primarily radiant. The use of such panels in parts of the country where the heating season is short and/or rates low is already making some headway (Fig. 17). Here again experiments are afoot on the possibility of using reinforcing in concrete floor slabs as a giant resistance coil. And in Holland, there is already extensive use of a standard asbestos board whose lightweight reinforcing is specifically designed to serve as a resistance coil (Fig. 18). Another development along slightly different lines is the electrically heated floor of Douglas Aircraft's Santa Barbara hangar. Here, steel tubing, filled with transil oil and centered by a continuous electric resistance coil keeps the floor at skin temperature—82-85° (Fig. 19). It is

even suggested that electrically heated fabrics—where the resistance coil is woven into the fabric proper—might serve as sources of radiant heat. In any event, the increased use of radiant electric panel heating seems to depend largely upon cheaper rates.

#### Availability of various types

Any of the above variations can, of course, be assembled from equipment already familiar to architects and engineers. However, only the types using steam or water as a heating medium have passed beyond the experimental stage in this country. It is around these two types that most questions pivot and that most data is available. Consequently, the following information applies only to them unless otherwise specified:

##### (1) Costs: installation and operation.

According to supporters of the radiant method, it is more economical. Since radiant heat warms the objects upon which it falls (and only indirectly and secondarily the surrounding air\*), only given surfaces need warming whereas convection requires that the entire air mass be warmed. Moreover, it is pointed out that in most buildings the human needs actually form only a small part of the heating or cooling load. The most direct heat transfer is the most efficient, and direct transmission of heat to or from the skin and clothing (without regard to air conditions) is possible only by radiant means.

At the present time, little authoritative and comparable data on installation and operating costs are available. Although Giesecke thinks that "the first cost of the (steam or hot-water) system depends largely on labor costs and will not vary much from that of the ordinary heating system", general experience to date seems to indicate that installation costs are somewhat higher. However, "it seems logical to assume that once the definite present trend of applying mass-production methods to the fabrication of radiant heating systems for medium-priced and low-priced residences gets fully under way, the initial cost of such installations may entail considerably less expenditure than is

\*This again is only relatively true. There is no perfect radiator in nature; hence there is always *some* heat by convection; hence in an unventilated room the air temperature *would* rise until an equilibrium between air and surface temperatures was achieved. This implies that radiantly heated rooms must be ventilated. But this is merely a negative way of stating one of the principal advantages claimed for the radiant method—namely that comfort can be maintained regardless of open doors and windows.

## RADIANT HEATING AND COOLING: Types using ELECTRICITY as medium

Courtesy "Electrical World"

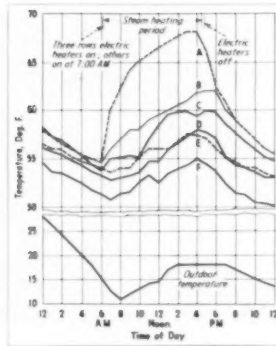
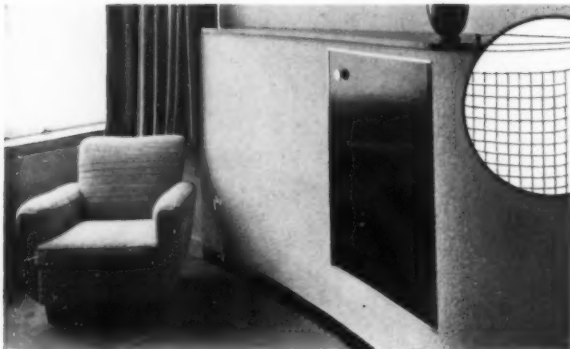


FIG. 17: Experiments by Detroit Edison in heating two identical rooms—one with conventional steam radiation, the other (shown at left) with electric radiant heaters—gave interesting performance data: Curves on chart at left show: **A**, steam-heated room at 62-ft. level; **B**, steam-heated room at 62-ft. level, exposed location; **C**, steam-heated room at 4-ft. level; **D**, electrically heated room at 62-ft. level; **E**, electrically heated room at 4-ft. level; **F**, electrically heated room, unheated section, at 4-ft. level.



ENCLOSURE WALLS ARE OF  $\frac{1}{2}$ " ASBESTOS CEMENT, PRE-CAST, WITH INTEGRAL REINFORCING MESH DESIGNED TO SERVE AS RESISTANCE GRID CONNECTED TO HOUSE CURRENT.

RESISTANCE GRID EXTENDS TO A BLANK BORDER 3" WIDE AT TOP, BOTTOM AND SIDES, AND 6" WIDE AT SIDES OF DOOR. METAL DOOR GIVES ACCESS TO AN ENCLOSED STORAGE CUPBOARD 6" WIDER THAN DOOR.

ENCLOSURE IS 3'6" HIGH.

FIG. 18: Commercially available in Holland is an asbestos-cement board whose reinforcing is designed to serve as an electrical resistance grid when connected to house current. Although used primarily to supplement existing heating systems, the product has wide applications such as folding screens, inside shutters for large glass areas, interior doors, etc. PAUL BROMBERG was the designer of the installation at left.

Courtesy "Electrical World"



FIG. 19: An electrical heating system of novel design in the concrete floor of a hangar in California. A single resistance-wire heating element, 53,000 ft. in total length and spaced by 1-in. porcelain insulation tubes, was placed in a  $\frac{3}{4}$ -in. galvanized conduit filled with transil oil. The conduit was run across the floor in loops 300 ft. long, spaced 2 ft. o.c. and arranged in 12 sections, each controlled by a thermostat. Peak-limiting equipment controls the heating load (supply voltage is 460, with 230 volts applied to each element), so that maximum demand is not increased.

## Types using AIR as medium

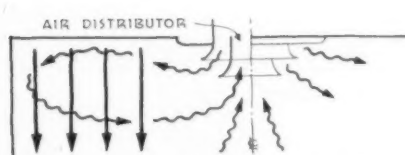


FIG. 20: Air distributor to warm ceiling by friction contact

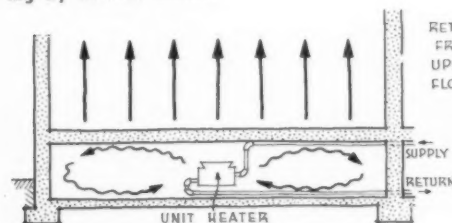


FIG. 21: Unit heater makes floor a radiant surface.

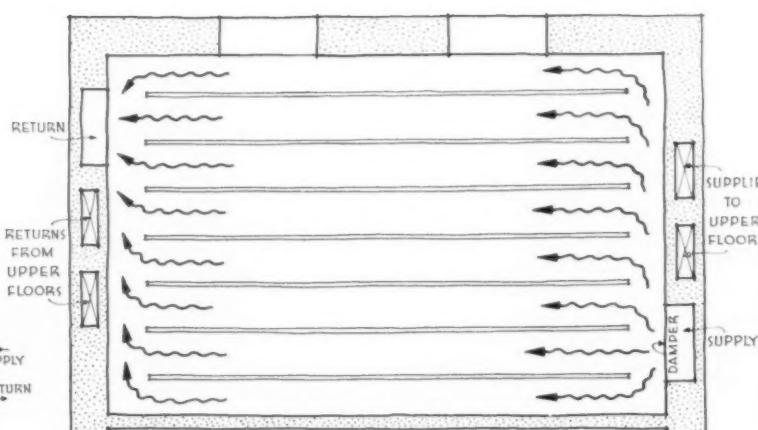


FIG. 22: Hot air forced through cellular floor

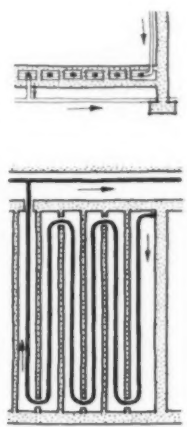


FIG. 23: Here air is heated *in situ* by pipe coils.



now considered necessary to obtain an adequate heating system. A number of firms already have done some work on developing a mass-production type of radiant heating installation.\*

Operating costs, on the other hand, appear to be definitely lower than conventional systems—due to the fact that (1) for equal comfort, air temperatures in radiantly heated buildings are lower; (2) also, the heating medium—when either water or air—is used at lower temperatures, thus further reducing fuel consumption. In this country careful comparisons of radiant and convection heating operating under identical circumstances are not available. But current estimates place radiant heating as reducing fuel costs as much as 30%. From Denmark comes the following report on a Copenhagen school†—six of whose rooms were heated by an independent radiant heating system (pipe coils in the ceiling), six by a conventional radiator system. The rooms were otherwise identical. “The measurements were performed under conditions as close to normal as possible—i.e., the heating plants were operated by an unskilled superintendent and the windows were opened by the teacher as often as necessary. . . . The temperature of the water in the boiler was 149 to 176°F, and the temperature of the inlet water for the panels was kept as low as 81 to 93°F by admixing the cold outlet water. From February 14 to February 27 the total heat consumption for the radiator heating plant amounted to 20,200 million Btu; for the panel heating plant, 14,000 million Btu, or 30% less. The radiator heating was much more sensitive to the opening of the windows than the panel plant; opening windows caused practically no increase of heat consumption in the panel plant but caused a very pronounced increase of heat consumption in the other. It should be pointed out that this lower heat consumption of the panel plant was noticed on weekdays only; on Sundays and holidays, when the boiler temperature sank to 122°F and the temperature of inlet water for the panel heating plant was not lowered correspondingly, the heat consumption of the panel heating plant was higher than for the radiator heating plant.”

## (2) Expansion and contraction: Confusion here is often between expansion

\*“Wrought Iron & Radiant Heating”, Technical Bulletin by A. M. Byers & Co., Pittsburgh, Pa.

†“Danish Experiences With Heat Consumption in Panel (Ceiling) Radiation Plants”, by P. Beck, Gesundheits-Ingenieur, April, 1939, p. 177.

of the *medium* and that of the *pipe*. Each main “run” of the system must be vented above the system’s waterline (Fig. 6), both to provide for expansion of medium and to eliminate air from system. No special provisions for expansion of pipe coils buried or partially imbedded in concrete slabs seem necessary.\* In plaster ceilings, the best practice recommends a three-coat job, with burlap reinforcing in the second (Figs. 6 and 7).

(3) **Pipe size and spacing** varies with each installation but current practice is that 1-in. pipe be spaced from 12 to 16 in. o.c.; ¾-in. pipe from 9 to 12 in. o.c.; and ½-in. pipe from 6 to 8 in.

(4) **Corrosion:** All the factors which operate in corrosion—whether external or internal—are naturally the same as in conventional heating systems. But these factors are, if anything, more important in radiant heating, since there is much more pipe and it is often imbedded in concrete or plaster. *Internally*, corrosion varies with heating medium, water conditions, and piping material under a wide variety of local conditions. It is very probable that any of the common grades of piping will give satisfactory service, if—before piping specifications are written—the composition of the water supply is checked and a pipe selected which will handle the supply without treatment. In this connection the following criteria are of value, according to L. F. Collins‡:

- (a) the fresh-water make-up should be kept to a minimum;
- (b) air-relief traps should be permanently installed, on the boiler and at high points on the system, to eliminate noncondensable gases (mostly air and carbon dioxide) liberated by heating the water;
- (c) direct contact between ferrous and non-ferrous piping should be absolutely prevented.

*External corrosion* is likewise a controversial field. Where coils are imbedded in concrete, according to Mr. Collins, “the prevention of external corrosion is dependent upon minimizing the amount of air and moisture which contacts such surfaces. Here it is manifest that only a concrete of maximum density should be used. Even so it is probable that because of the cycles of

\*Best proof of this is in such skating rinks as that at New York’s Madison Square Garden, where quick program changes necessitate much more abrupt temperature changes than ever occur in ordinary heating and cooling installations. This particular system is buried in a slab which is topped with terrazzo and has operated satisfactorily for a number of years.

‡As chemist for the Detroit Edison Company, Mr. Collins has done extensive research on corrosion in heating and power installations.

expansion and contraction through which a heating system goes that voids about the lines are bound to ensue.” Here, again, although all reasonable care should be exercised in both concrete and plaster, the best course is to select a pipe which has proved satisfactory under similar conditions. Until such a time as research provides generally accepted standards, careful analysis of all factors in each specific job will be required.

(5) **Time lag in starting** is naturally a function of the material in which coils are imbedded, the insulation behind them, the temperature of the heating medium, and the surface temperature desired. Where this surface is of metal, welded to the coils, the lag is reduced to a minimum (Figs. 13, 14, 15, 16). Where the coils are imbedded in concrete, the time lag is probably greatest and can be reduced by use of higher temperature water at starting.

(6) **Time lag in stopping** (temperature decay) is a slower process and largely a function of surrounding air temperatures. To speed it up both boiler (and circulator, if water is medium) are usually cut off. In extreme cases, cold water could be circulated to hasten cooling, but this involves the risk of introducing air into the system.

In general, too little data on time lag are available to indicate that any substantial difference exists between radiant and conventional steam or water systems. In most building types, the slow temperature decay of radiant systems would seem desirable in keeping buildings comfortable over holidays (Fig. 10).

(7) **Measuring instruments and controls:** Although several instruments have been perfected and are now in use for measuring radiant heat in experimental and testing work, no single instrument for combined measuring and control is as yet commercially available. However, many current installations are being satisfactorily operated by thermostatic control. Here, by a process of trial-and-error, a comfort zone is established; the air temperature at this point is then taken and the thermostatic control set accordingly. This air temperature of course serves only as a rough index to the mean radiant temperature necessary to maintain comfort in a given room or area under given conditions. All other controls, valves, and equipment used in conventional heating systems are readily adaptable to radiant installations.



## BIRD'S-EYE PLANNING: NEW FACTOR IN INDUSTRIAL BU

Twenty-one months ago the RECORD said\*, "Only the building designers of the American continents are in a position to view such problems (as air raids) with any degree of detachment." This is more true today than ever; but the spread of war has lessened the detachment. Herewith, Konrad F. Wittman, New York architect with wide European experience, analyzes some specific factors involved in making factories "airworthy".

ALL WARS USHER in revolutionary changes, not only political and economic but also technical; and this war, one of machines and technics, will have long-felt repercussions. Entirely new problems arise for the planning of cities, industrial areas, and factories. Every planning was until now based on the solid earth—on making the most of the condition of the soil, of sunlight and wind directions, of traffic-lanes, waterways, railways, and streets. Nobody took into consideration how all this

would look from the sky; but it is this "bird's-eye view" which has proved so important in Europe.

The fighting plane tries to destroy the vital industries of the enemy, even in the middle of the country. To protect factories against such aerial attacks, to reduce the effect of bombings, to secure the rapid reconstruction of damages are among the most important strategic tasks, if the fighting army is not to be exhausted from the rear.

History has analogies at hand. The invention of firearms made ineffective the walls of medieval towns. They

were torn down, and a new era of life and municipal expansion began. Today the airplane overpowers natural and artificial strongholds, changes the scene of war, and will cause a new epoch of city and regional planning. We are now at the beginning of this development, and we cannot yet foresee how it will change the face of our cities and of our country. The alterations may be manifold and radical.

Engineers, architects, and city planners will have to study the ruses of defense, the strategy of hiding, camouflage, and delusion. Many advantages of economic planning must be sacrificed for the sake of strategic security, and many a proud dream of our era of glass and light will fall a victim of the "evil eye" from the sky. The importance of

\*What Does Military Design Offer the Architecture of Peace? AR, 1/39, pp. 50-56; 3/39, pp. 68-75.





McLaughlin Air Surveys. Insert of plant by dome



Glittering water surfaces, shining roofs, bright windows, and white parking fields make easy targets. The buildings are easy to recognize by their straight lines and strong shadows.



This is the same factory, totally camouflaged by planting, paint, alterations of the roofs, and wide-spanned nets. All shapes and shadows are dissolved. Trees play an important part.



Air-protective planning brings factories out of the neighborhood of cities, into the woods and countryside, adopts the general colors of the landscape to camouflage the buildings.

## AL BUILDING DESIGN?

these changed conditions has been discussed and experienced for many years in Europe, especially in France and Germany.

Congested industrial centers—such as Jersey City or Bayonne—are easy targets for aerial attacks, and an attack on such huge masses of factories can have the most devastating effects. A few bombers could cut the vital lines of numerous industries, where plants, bridges, railway junctions, ports, and storehouses are so close together. On the other hand, the gigantic plants which are distributed over the whole country are also very easily located from the sky, with their rigid geometry of straight-line shapes, with huge halls of glass and steel, with bright and reflecting roofs and skylights, with shining

railway lines, with streets of concrete and square parking places, with smoke and steam from tall chimneys.

Big new plants have been built in Europe in wooded and remote rural areas, not as a compact mass of buildings, but decentralized in numerous smaller plants and factories, with the trees of the forest vaulting over the streets connecting different buildings. To bomb a forest of several miles circumference is a difficult task. Fifteen or twenty separate buildings, each a quarter of a mile or more from the next one give an uncertain target, and even if one of these buildings is struck, the damage is localized, and cannot affect so seriously the operations of the whole plant.

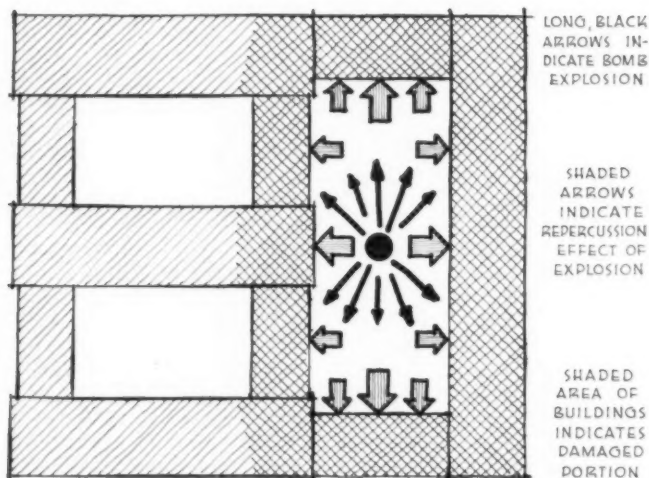
Of course a plant built on these prin-

ciples lacks every economy of transportation, of power and supervision, but it has a relatively great security from air attacks. But in wartime, economy has to be balanced with air protection. Concentration was until now the guiding idea of factory planning, uniting in a single structure all the manufacturing facilities. The excellent economies of control through concentration were attained, however, without any regard for threatening dangers from the sky.

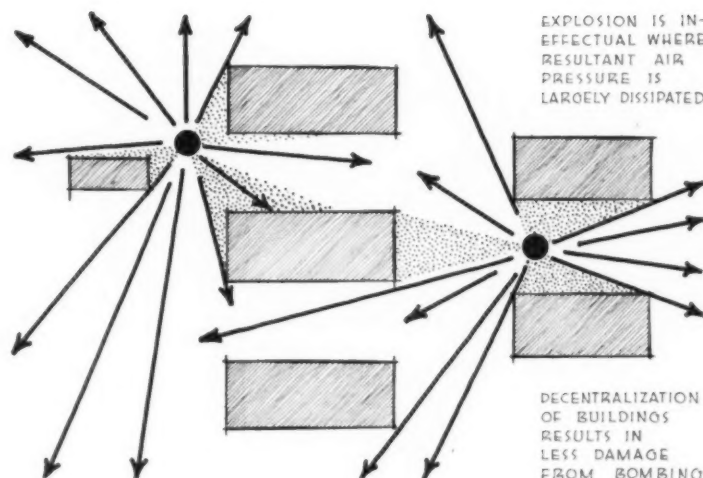
The strategy of protection for the important war industries should begin with the site of these industries, diminishing the risks through widespread decentralization. City planners have for many years favored the division of cities into residential sections, business sections, and industrial areas; but this was still



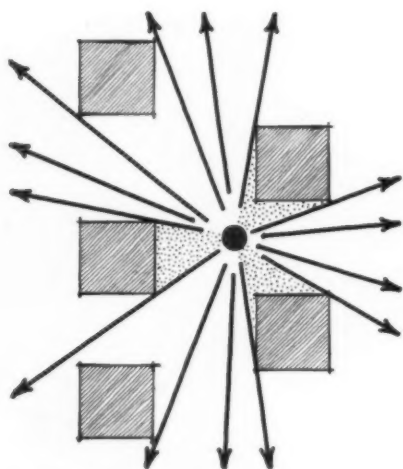
## EFFECT OF EXPLOSIONS...DECENTRALIZED PLANNING



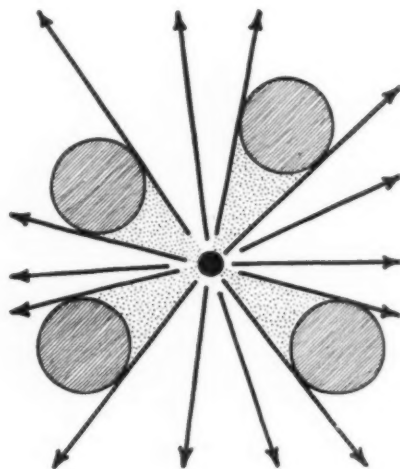
The violence of explosions increases in narrow courts enclosed with stout masonry walls. Factories of the older type with high and low buildings around courts are highly vulnerable; here explosions are most destructive.



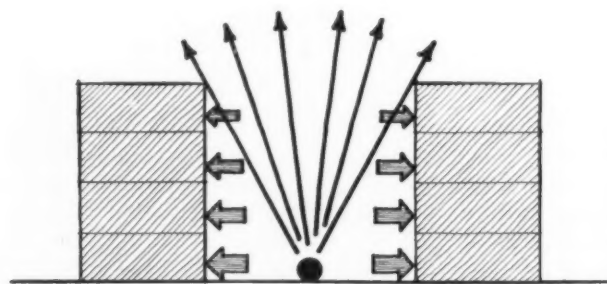
The risk of demolition will be reduced if the expanding gases can find escape along lines of low resistance. Therefore, no narrow courts, no narrow streets, and much open space between the buildings decrease bomb destruction.



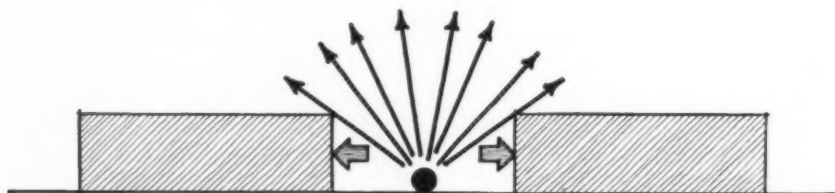
The effect of explosions is relatively smaller with square buildings, because less wall surface is exposed in relation to floor space.



Round buildings would have theoretically the smallest vulnerability, because they offer least resistance to the effect of air pressure.



Multistory buildings are more vulnerable than one-story buildings, because they offer more resistance to air pressure. Consequently lower buildings are preferable.

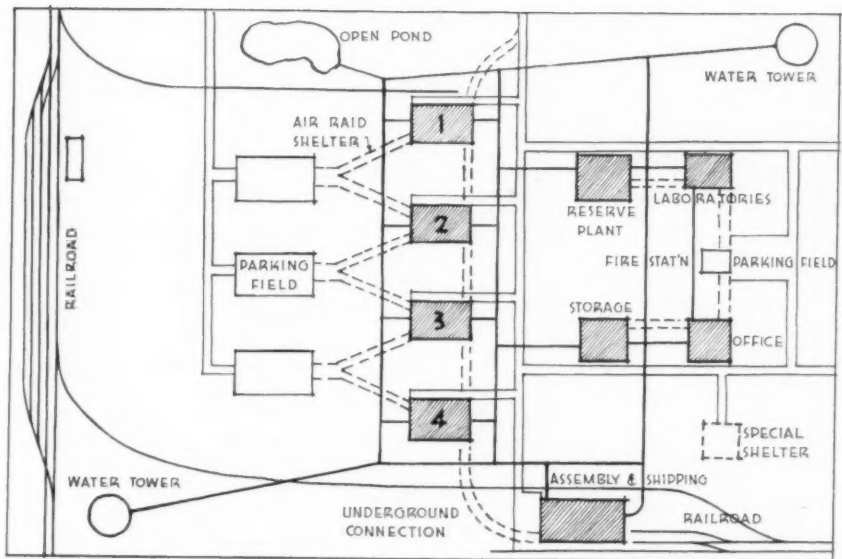
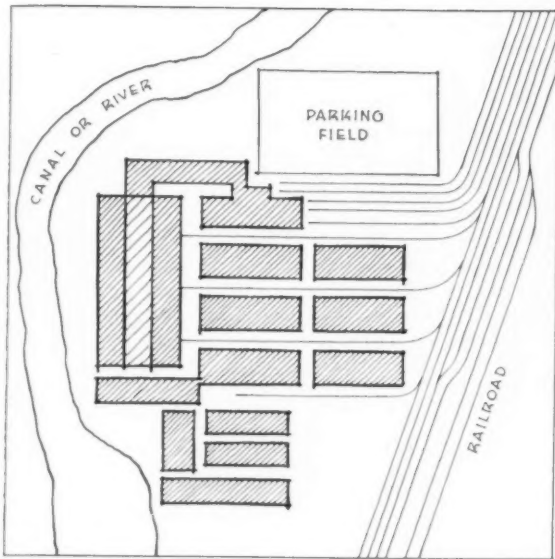


a peace-time conception. The new problems far exceed these aesthetic and hygienic requirements. Industrial works in the neighborhood of thickly populated cities are always a danger for civilian populations, and make it easy to spread panic and destruction. Until now it was quite natural that industrial plants should be attached as closely as possible to traffic arteries. Railway junctions and highway crossings are favorite targets for bombing attacks, and therefore no good neighbors for factories. It proved disastrous for France that most of the important war industries were in the Paris area or near the border. Factories in smaller places or in remote parts of the country are less endangered. Here, too, the economy of transport becomes secondary after the security of the plant. Even without laying undue emphasis on this subject, this may give an indication of how revolutionizing the new problems are.

Air-protective design concerns the subdivision and grouping of buildings and their shape and size. Congested factories, as older factories usually are, are more vulnerable for complete devastation; groupings of buildings (with each of these buildings not too large) are better than single structures of large extent. Narrow squares within the factory augment the effect of bomb explosions.

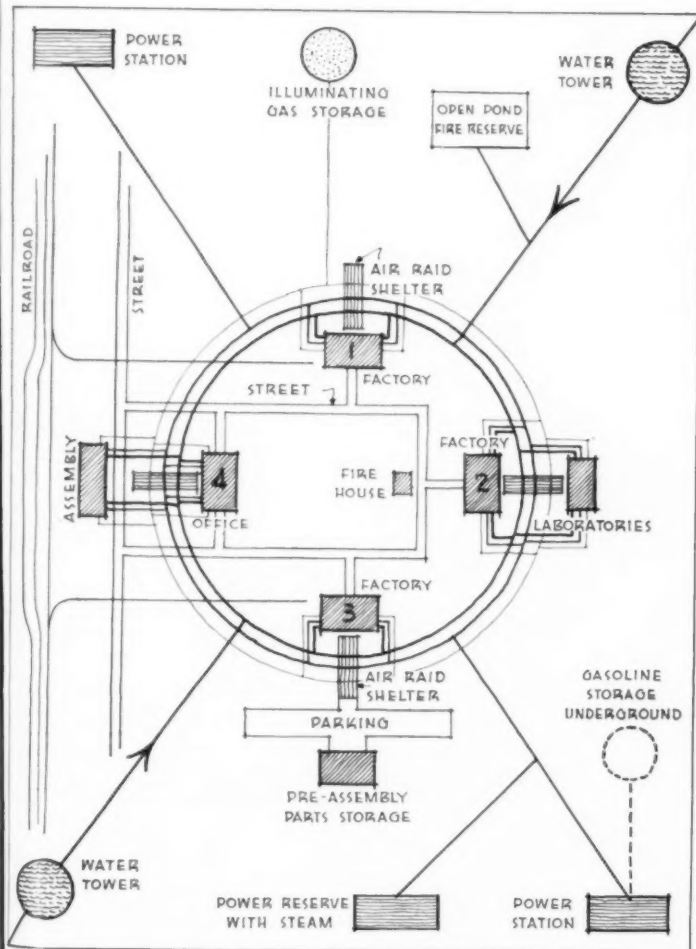
Solid walls of brick are more liable to collapse from explosions than structural frames. The risk of demolition from an explosion will be reduced by providing open space between the buildings.

Powerhouses and water towers should be removed as far as possible. Laboratories, testing machines, and special tools or instruments which are secrets of production require special protection.

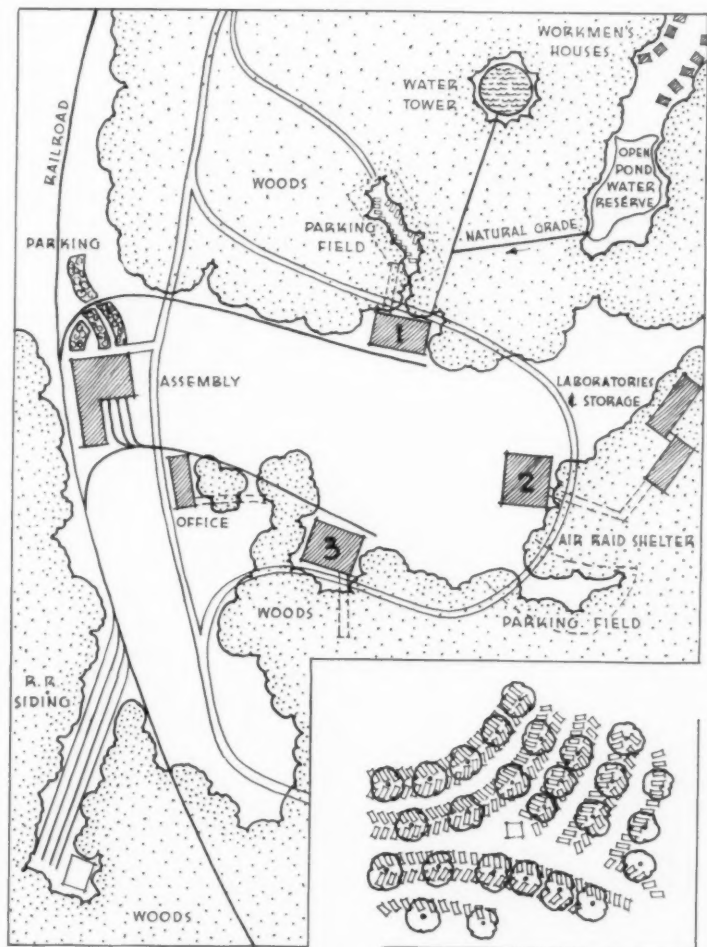


Factories until now were built on the principle of bringing all the buildings as close together as possible, avoiding traffic within the factory, and allowing uninterrupted manufacturing processes. Immediate access to railroad lines, switchyards, and waterways were thus especially economical.

Scheme of a factory in air-protective design: decentralization of buildings, of air shelters, exits, and parking fields; decentralization of water towers, power stations, storage tanks; two separate railway stations; plant buildings in reserve equipped with machinery ready for use to prevent interruption of the manufacturing; fire-watch station with special training rooms for firemen, air-raid wards.

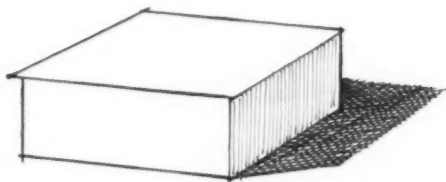


Theoretical scheme of decentralized plant with supply lines indicating: (1) that power stations, water towers, gasoline tanks have to be built far away from factory buildings; (2) that every building has to have two separate connections with two separate gas and water mains or electric-supply lines. Proper fire equipment is essential.

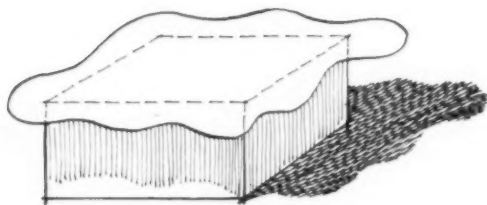


Irregularly organized groups of buildings are more difficult to find from the sky than regular ones. Placed between woods and trees, in harmony with the general lines of the landscape, they are very difficult to locate from an airplane. Camouflage is easy. The straight lines of parking fields can be covered by trees.

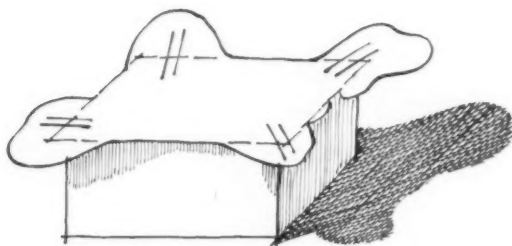
## SHAPES AND COVERINGS OF ROOFS...PROTECTING WINDOWS



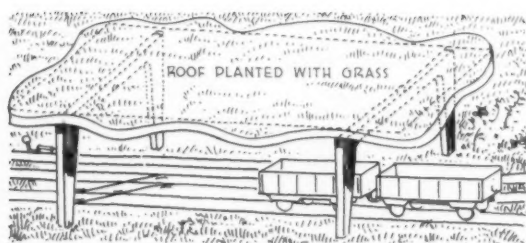
Houses with geometrical shapes and straight shadows are easily spotted from the sky.



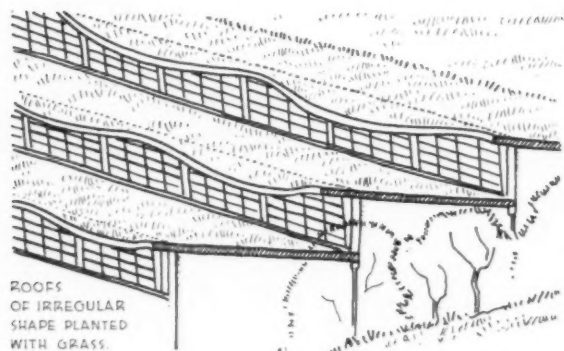
Roofs with curved shapes distort the rigid geometry of light and shadow. The roof itself can be painted in the colors of the surroundings, but with flat, not glossy paints.



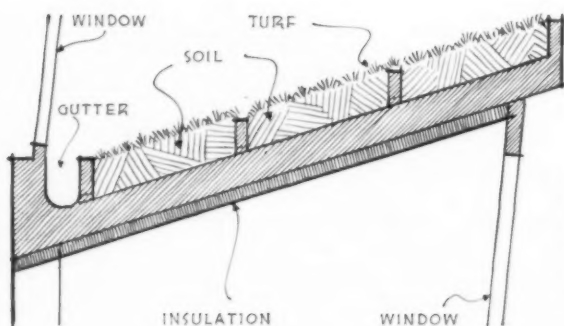
Projecting slabs can be temporarily added in war times to give distortion of the shadow. Such devices have to be changed from time to time.



Roofs which are planted with grass or even with small shrubs can match their surroundings almost entirely under all weather and light conditions.



Low buildings with large flat roofs are especially fit to be planted with grass, which absorbs light rays completely. But sloped or saw-tooth roofs may also be prepared in this way.



Excellent drainage, and insulation against heat escaping from the building, are necessary to secure natural conditions for the sodded roof, especially in winter time.

tion. Isolated buildings of bombproof construction should protect these mechanisms. Glass roofs, roof lights, saw-tooth roofs, cause severe difficulties in war time; there is no protection against the danger of widespread breakage of windows and glass roofs. Underground factories have seemed until now the only escape. Perhaps a new type of plant, built recently in the United States, may prove effective. Designed to permit high-speed production, they are windowless and equipped with zoned air conditioning and a new type of fluorescent lighting. They have proper light and temperature and humidity for 24-hour work periods, independent of outside conditions.

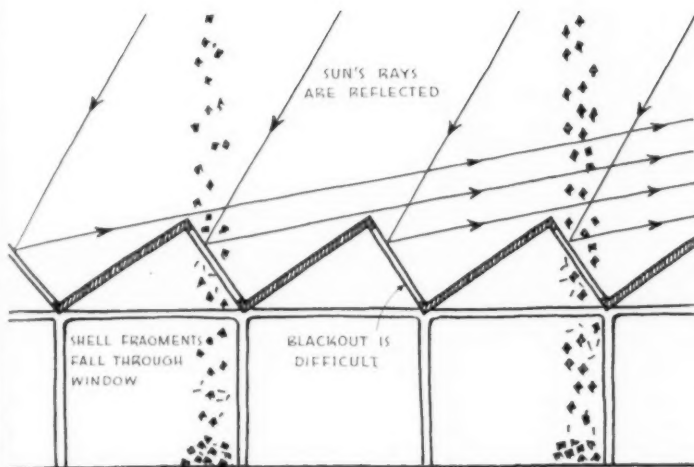
The security which cannot be accomplished by design alone must be perfected by skillful camouflage. This, a science in itself, has to be based on careful and repeated observations. Camouflage has to deceive not only the aerial observer but also the aerial camera. This doubles the requirements, because the appearance to the observer and the camera eye are not always the same. The aim of absolute camouflage would be to render a building "invisible" or unlocatable from the air. This is not possible, because it is difficult to deceive the camera; but a confused object makes a poorer target in the hurry of flying than a sharp contrasting one.

To break up the geometric shapes and hard shadows, which are easily discerned in aerial photographs, flat roofs can take on irregular serpentine shapes with attached projecting slabs, permanent or temporary. Planted with grass, shrubbery, and even trees, they may pass for a pleasant garden or a lawn in a wood. Trees around the factories or on parking places make it difficult to separate the camouflaged building from its surroundings. In this way the embellishment which trees always give can turn out to be very useful. Roofs may be painted green, or brown and gray like fields. In general dark colors and flat paint are preferable, and new buildings, especially new roofs, have to adopt the general colors of the scenery. Many of these "fakings" can be permanent; others are necessarily temporary. The cunning magic of camouflage tries to present a wood instead of a factory. Strips of cloth can be spread temporarily over whole buildings; leaf-covered nets make a house, a railway junction, or a pond disappear.

Water reservoirs ought preferably to be underground, but as towers they can be disguised and placed between trees. A water basin for emergency use can be shaped like a harmless swimming-pool. A woodland of pine and leafy trees, spread over hills and valleys, with a variety of dark and light colors and shadows is the most appropriate landscape to hide even a large plant. Sometimes an artificial fog, laid in a valley, may prove very successful. Conditions of wet or dry weather, the appearance in summer and in winter, the light reflecting aspect in the morning or in the evening, or in moonlight, must be taken into account.

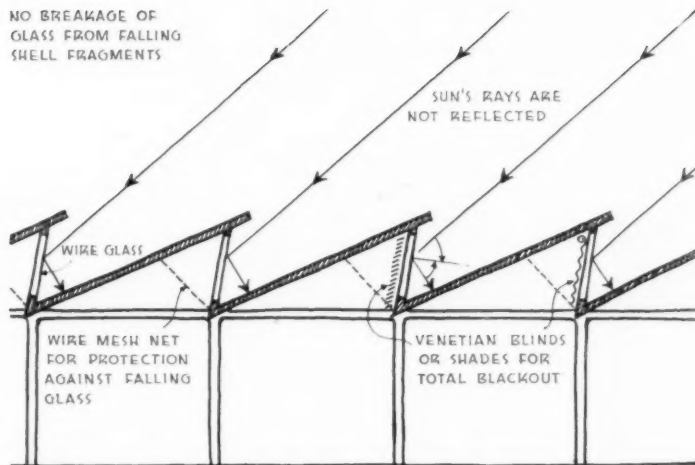
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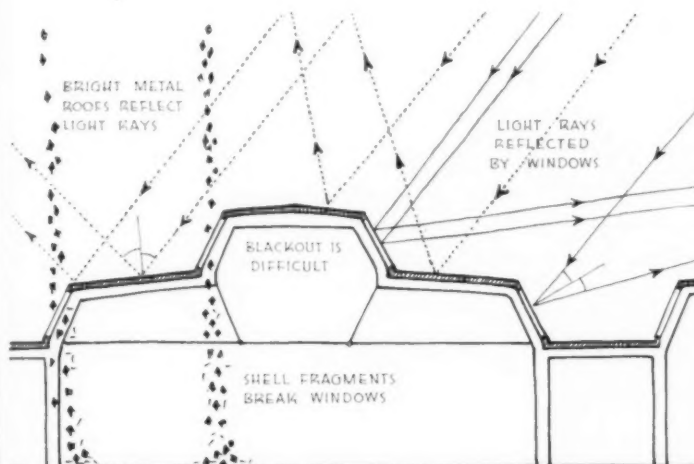


Saw-tooth roofs—so essential for many types of factories—have been built until now in different systems, but all following the same principle. These roofs reflect the sun rays at great distances and form an easy guide for the airplane. They are also very vulnerable to shell fragments.

NO BREAKAGE OF GLASS FROM FALLING SHELL FRAGMENTS

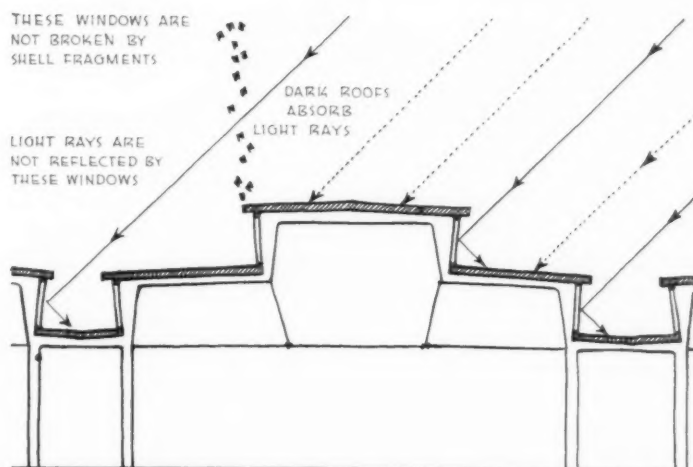


A new type of saw-tooth roof should be developed which avoids, through the inclined position of the glass, the reflection of the sun rays, which protects the windows with wider projections, and which permits their being easily blacked out.



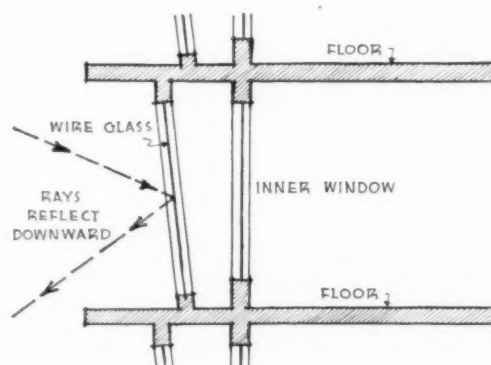
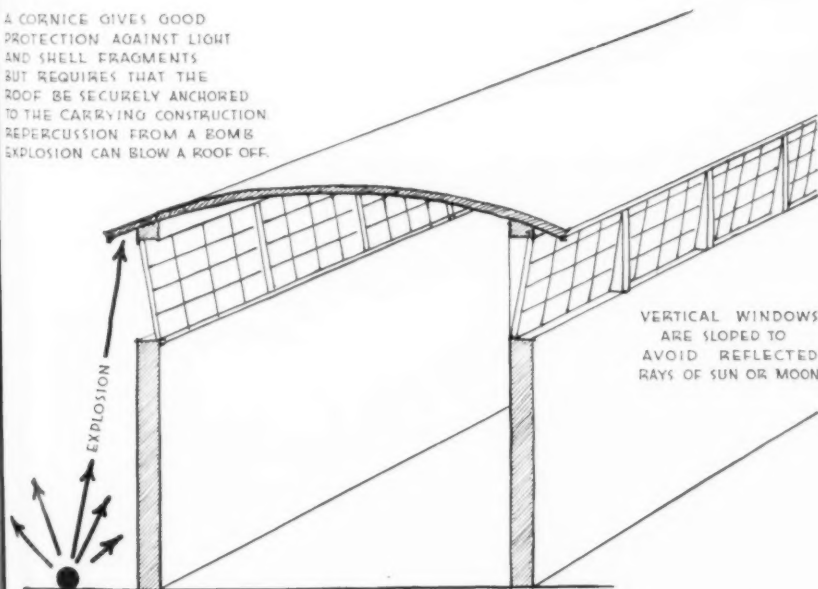
The same principle may be applied to all the other types of roofs which are designed for large industrial buildings. This roof reflects light from glass and bright metal, and the plant can be seen from far away. Windows are more often broken by shell fragments from antiaircraft batteries than by actual explosion.

THESE WINDOWS ARE NOT BROKEN BY SHELL FRAGMENTS



The revised design for this roof absorbs the sun rays by inclined windows and dark, flat coverings. The roof is no longer bright from the sky and is more easily camouflaged. The windows are better protected against shell fragments. Blackout is easier.

A CORNICE GIVES GOOD PROTECTION AGAINST LIGHT AND SHELL FRAGMENTS BUT REQUIRES THAT THE ROOF BE SECURELY ANCHORED TO THE CARRYING CONSTRUCTION REPERCUSSION FROM A BOMB EXPLOSION CAN BLOW A ROOF OFF.



Long rows of windows distinguish factories from other kinds of buildings. Therefore, careful and repeated observations from airplanes must check the light-reflecting qualities of different kinds of windows and roofs. The protection of windows—and of machinery from splinters of broken windows—will produce new types of industrial construction.

Window panes of cellophane in standard sizes, which are still in an experimental stage, may prove very practical.

# REVIEWS OF CURRENT BOOKS

**A METHOD FOR ANALYZING THE ECONOMIC DISTRIBUTION OF SHELTER**, by John Burchard, with the help of William E. Haible and Margaret Hopkins, Davis Mayer, and Harry Weese. Published by Albert Farwell Bemis Foundation, Massachusetts Institute of Technology, Boston.

A METHOD FOR ANALYZING the economic distribution of shelter is the subject of a report released by the Bemis Foundation. The material is graphically summarized on the two charts pictured below. Chart A shows a graph which traces the percentage of families in the United States having annual incomes ranging from 0 to \$7,000. From the curve shown on Chart A, Mr. John Burchard, Director, and his associates have traced a series of graphs, as shown on Chart B, which reveal the percentage of families that can obtain shelter for which production cost ranges in intervals from \$1,000 to \$10,000 per family unit.

The reasoning on which the graphs are plotted is based upon an obvious equation. The ability of a family to pay rent must equal and limit the proportion of production cost which can be paid back each year in economic rent. The equation reads:

Annual income multiplied by the percent of income devoted to shelter equals production cost of shelter multiplied by economic rent expressed as a percentage of production cost. Transposing this into symbols:

$$IS = PR \quad \text{or} \quad P = (S/R) I$$

The general direction of the curves on the diagram appears to confirm at once the generally recognized axiom that the

cheaper the original cost of the house, the larger the percentage of American families that can afford to live in it. The graphs also confirm the equally obvious fact that as rent is reduced to a smaller percentage of original cost, a far larger proportion of home seekers can afford to live in better types of housing.

Immediately a question arises as to the practical application of the graphs. The key to the interpretation of the chart and its graphs lies in a ratio of rent as a percentage of income to rent as a percentage of production cost. Mr. Burchard makes clear in his report that there are infinite varieties of relationships which are possible. The value of his graphs will not be that they tell a specific story which may be accepted as fact but that, inasmuch as they do show a relationship, they may stimulate thinking on the part of those concerned. In order to calculate the two factors which Mr. Burchard makes the basis of his ratio, a good deal of thinking will have to be done. It is stated frankly in the report that far too little basic data have been assembled to form a really accurate basis for the calculation of the variable factors which make up the factor of economic rent, which is also a variable.

Mr. Burchard's Appendix III, however, shows clearly a method for analyzing the influence of these factors, even though one cannot entirely agree with the analysis that he puts forward as typical. The graphs show certain self-evident truths. In order to make use of them it will be necessary to translate many of the forgotten items which go to make up rent into percentages. For

example, little is known of maintenance costs and few persons are familiar with maintenance costs for various types of housing expressed as percentage of original cost. Investigation of maintenance costs ought to be of value and ought to stimulate ways and means for reducing necessary outlay for maintenance.

Certainly there should be in the calculation of economic rent an item for amortization. The remarks which have been made in Appendix III on the interest rate lead to the supposition that in most cases, perhaps for a long time to come, the major part of economic rent will be due to financing costs, and that a large part of these costs will be interest paid for borrowed money. Depreciation allowances should not be confused with amortization requirements. Borrowed capital must be repaid. Certainly the burden of repaying that proportion of original cost which is borrowed must be earned by the house over the period of its usefulness. Therefore it seems that amortization must be a basic factor in the calculation of rent. Depreciation and obsolescence are entirely different factors. Their purpose is to reflect the change in value which occurs over a period of years. Their cumulative effect is to translate original production cost into current value.

What benefit may the individual architect derive from Mr. Burchard's interesting graphs? An architect can see at once, as the report points out, that if economic rent be 11.1% of original cost and the family budget for shelter be 20% of total income, then the factor

(Continued on page 120)

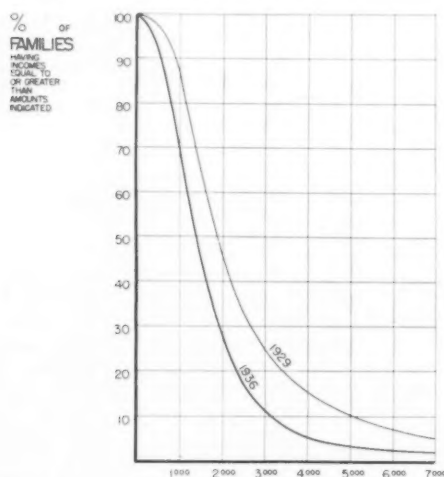


Chart A \$ INCOMES

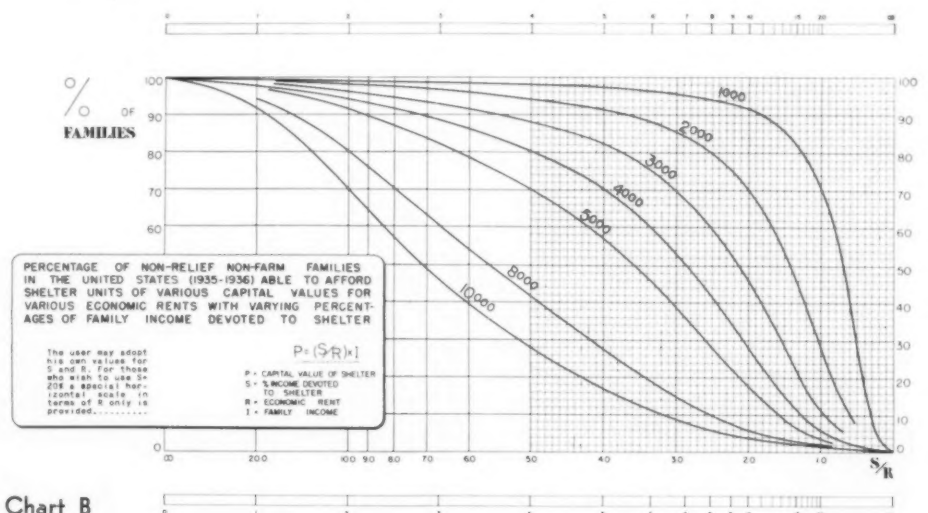


Chart B

# CURRENT TRENDS OF BUILDING COSTS

Compiled by Clyde Shute, Manager, Statistical and Research Division, F. W. Dodge Corporation, from data collected by E. H. Boeckh & Associates, Inc.

CURVES INDICATE trend of the combined material and labor costs in the field of residential frame construction. The base line, 100, represents the U. S. average for 1926-1929 for residential frame construction.

Tabular information gives cost index numbers for the nine common classes of construction. The base, 100, in each of the nine classes represents the U. S. average for 1926-1929 for each particular group. The tables show the index numbers for the month for

both this year and last.

Cost comparisons, as percentage differences for any particular class of construction, are possible between localities or periods within the same city by a simple process of dividing the difference between the two index numbers by one of them. For example: if index for city A is 110 and index for city B is 95 (both indexes for A and B must be for the same class of construction), then costs in A are approximately 16% higher than in

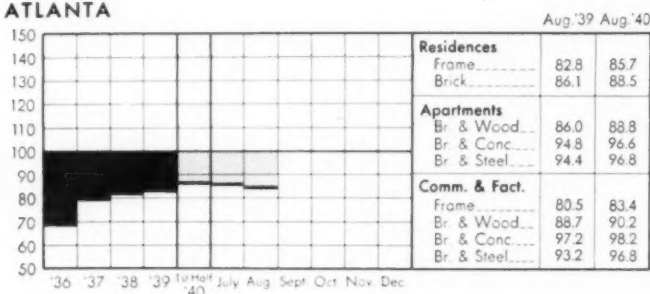
B  $\left( \frac{110-95}{95} = 0.158. \right)$  Conversely it may be said that costs in B are approximately 14% lower than in

A  $\left( \frac{100-95}{110} = 0.136. \right)$

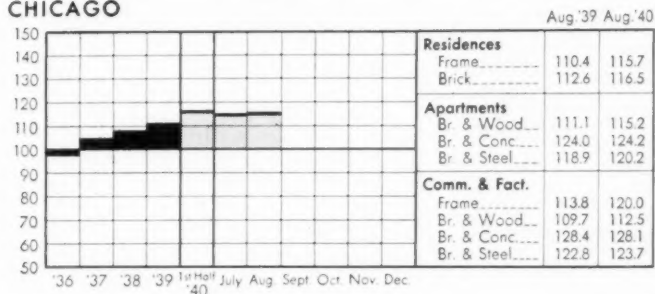
Similar cost comparisons, however, cannot be made between different classes of construction since the index numbers for each class of construction relate to a different U. S. average for 1926-1929.

**CONSTRUCTION COST INDEX** U. S. average, including materials and labor, for 1926-1929 equals 100.

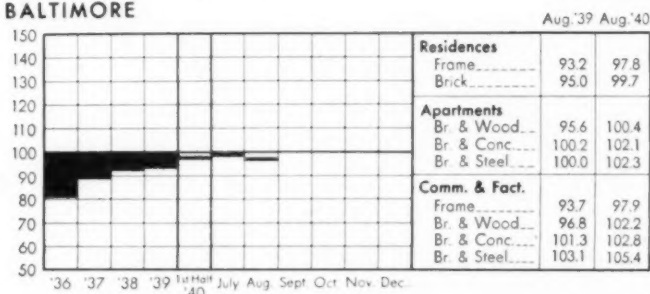
## ATLANTA



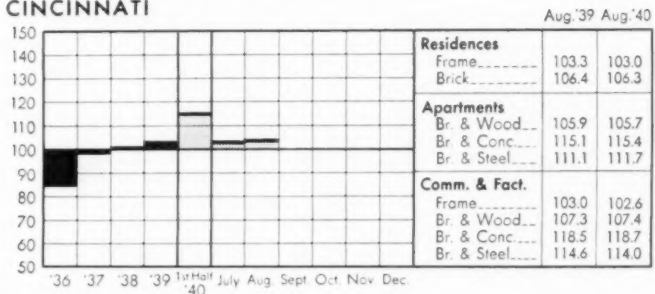
## CHICAGO



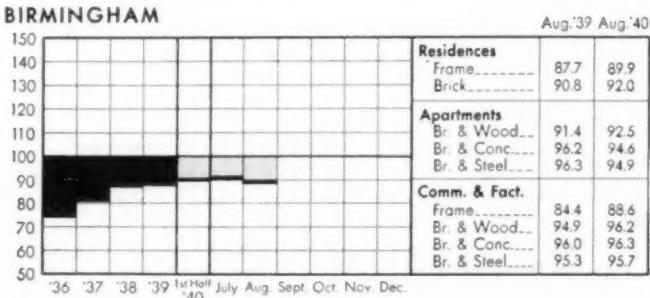
## BALTIMORE



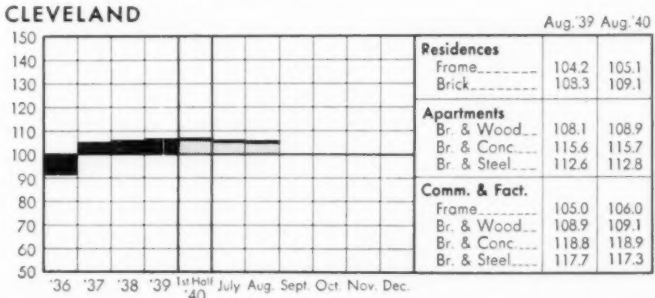
## CINCINNATI



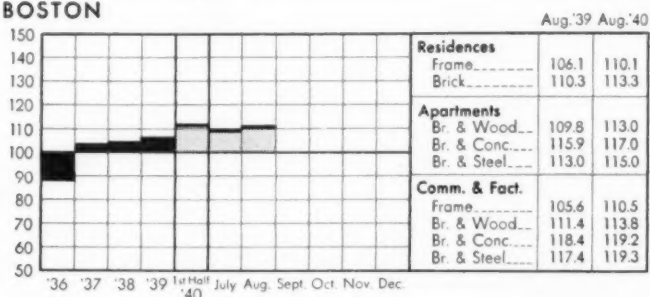
## BIRMINGHAM



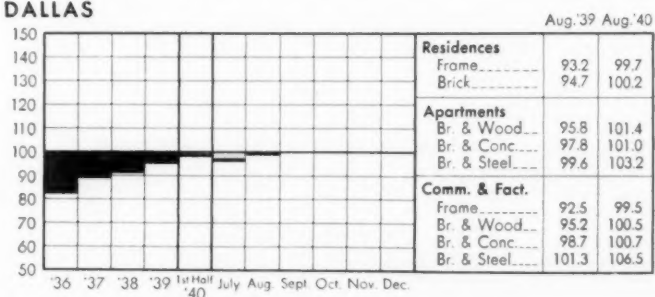
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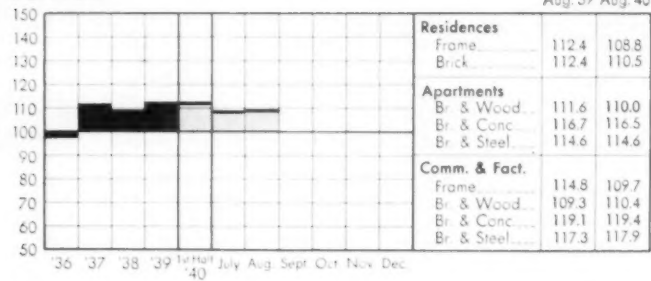


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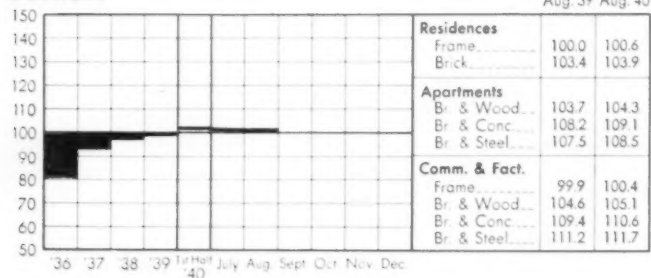




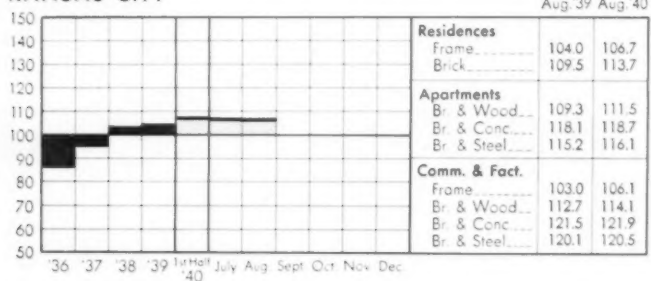
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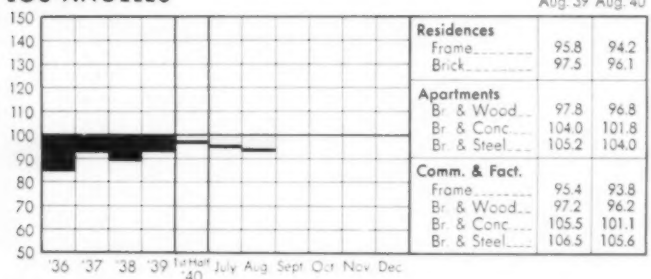
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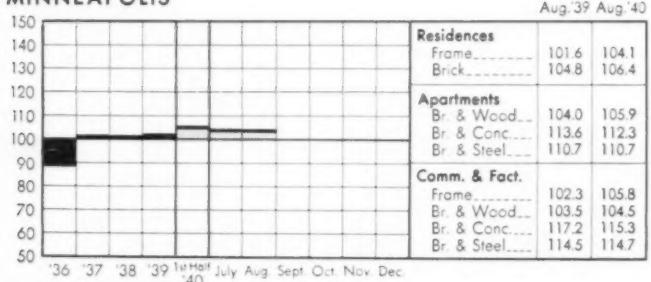
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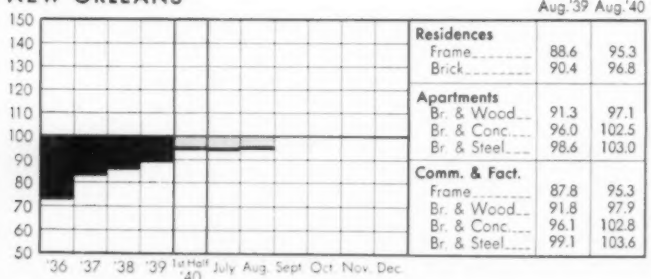
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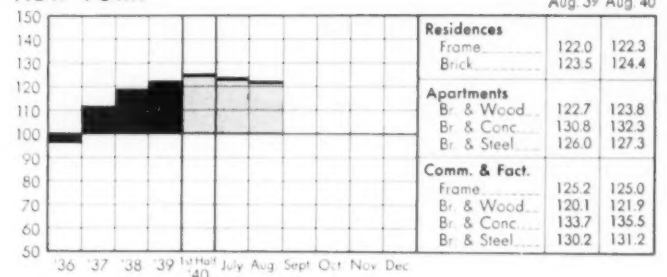
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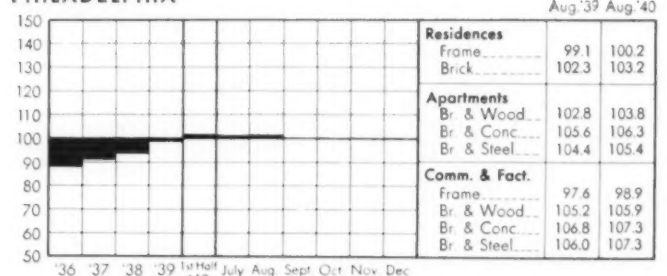
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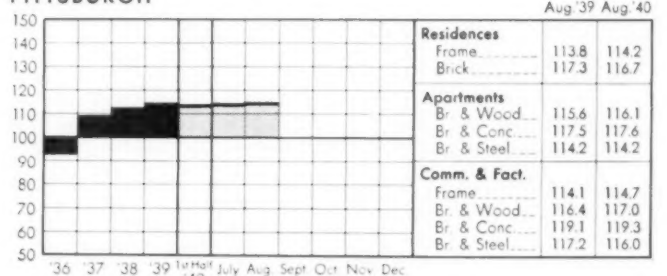
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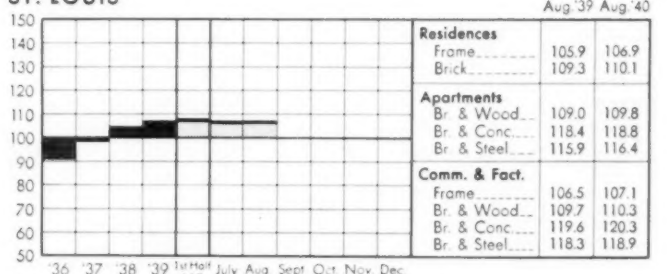
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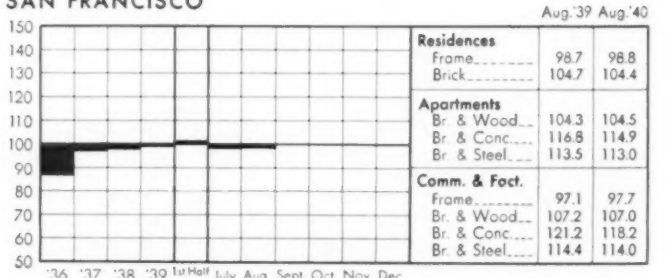
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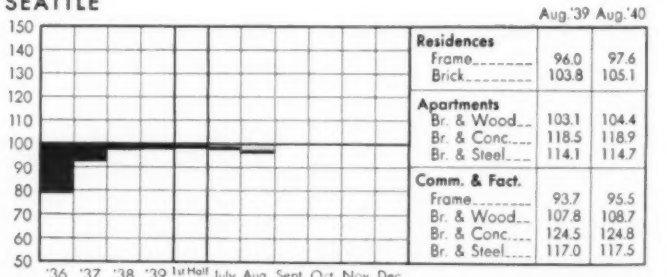
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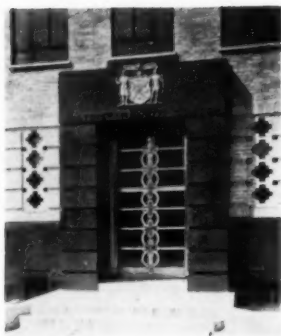
# SAN FRANCISCO



# SEATTLE



# HEALTH CENTERS



Many American cities and rural areas are awakening to local needs for community health programs, and for buildings to house them. Federal, regional, municipal, and private organizations have been instrumental in erection of health centers..... Such a structure has, today, a

different function than a hospital or a welfare agency; its purpose is to serve as a central focusing point from which the work of protecting a community's health can proceed. A health center needs to be at once intimate in character—to emphasize necessarily close relations between the health program and all the people in its locality—and somewhat impressive—to lend stature to a science still young. . . . Statistically, since their history is comparatively short, health centers may be unimportant when considered against the background of total building volume in this country. The time may come when they will be as ubiquitous as schools, churches, or municipal buildings. Individually, health centers built in the last few years range in cost from a few thousand to half a million dollars, and in area from 5,000 to 30,000 or more square feet.\*

\*"District Health Administration", by Ira V. Hiscock; "District Health Development", Dept. of Health, New York City.

(Photo by Wurts Bros.)

## BUILDING TYPES

## Growth of a Service Suggests

# BUILDING STANDARDS FOR COMMUNITY HEALTH

THE MODERN HEALTH CENTER has evolved from a number of sources in Europe and the United States. Early provisions were almost universally privately financed; official status has only been achieved comparatively recently, and the process of consolidating the work of public and private agencies is continuing. In many cases, where public funds are not available, the stimulus of foundations such as the Commonwealth Fund, Milbank Memorial Fund, Duke Foundation, W. K. Kellogg Foundation, and numerous others, has aided establishment of local facilities, either official or semiofficial in nature.

Early buildings of this kind were the settlement houses, of which Toynbee Hall in London, opened in 1884, and the Henry Street Settlement in New York City, were among the first. In the late nineteenth and early twentieth centuries the settlement-house idea spread to Rochester, Cleveland, Boston, California, and other localities. Medical work carried on in settlements was often intended to be principally preventative and educational, as distinct from curative measures, and formed part—an extremely important part—of a broad social-service program. Medical functions, however, were in practice usually curative to a great extent, as the pressure of need for treatment was imperative. This problem remains an active one, particularly for welfare organizations which serve families with low incomes.

Later there developed centers which seem, from a present-day view, to have marked a transition to health centers as they now exist in many localities. Public-health departments and officials, too, began to increase the scope of their activities beyond such fundamentals as control of sanitation, toward aiding, if not actually practicing, preventive medicine and educational work.

### Present agencies and functions

From the foregoing, types of agencies and functions at present housed in health centers are apparent.

*Agencies* are both *public*, including health departments of the region, municipality, or district served, and *private*, including charitable, welfare, and other voluntary or privately endowed or operated organizations. In many cases, private organizations were first in the field. In order to make the best use of their spadework, and in order to increase the efficiency of services offered in fields in which private effort continues to be the most suitable means of participation, private agencies are commonly invited to co-operate in community health programs; office space is provided when necessary; and use of such facilities as laboratories is made available.

A specialized type of participation is engaged in by agencies which train workers—administrators, doctors, nurses, social-service workers. Such training is offered by both health departments and by schools of medicine.

*Functions:* In general terms, a community health program's field of activity may be said to include all matters which directly affect the health of the public. For practical reasons, the program is usually restricted to certain types of preventive medicine, health education, sanitation, and social-service work.

Such classifications are by no means exact, since many departments overlap, and local conditions may cause great variation—may even extend the scope of activity into fields seemingly unrelated.\*

The accompanying tabulation lists functions which normally fall within the province of a community health program. Not all health-center buildings are required to house all activities; some may be spread out over many centers; others, sometimes subdivisions of a subject (for instance, tuberculosis), are often important enough to warrant extensive independent facilities.

\*Health Center in Meridian, Miss., which the Commonwealth constructed for the county health department, contains a workshop where well-drilling apparatus was built for use in providing satisfactory water supplies for schools and private homes.

### Types of buildings

There are at present two distinct main classifications into which health centers fall: *First*, those which house only purely preventive and educational activities; and *second*, those which include facilities for hospitalization. The kind required by a locality is dependent upon local policies, legislative requirements, and local needs. In some cases, the less exacting requirements and more modest cost of the purely preventive center, the closeness with which it can be tied to the local health department, and the absence of the tendency of pressure of acute illness to obscure preventive functions, may render the first type most satisfactory. In other cases, it may become desirable to incorporate both preventive care of the well and ministrations to the sick in the same program, perhaps under one roof.

Provisions in New York City are of the first type, and may serve as illustrations of urban developments. It should be borne in mind that New York's tremendous population imposes special problems in administration and planning which are unlikely to be met in the same form elsewhere.

*Special planning requirements:* Considered paramount in importance is the necessity for making health centers of all types intimate parts of the daily life of all persons in the communities served. This means decentralization of functions, even up to the point where administration may become complicated. It also reduces the necessity for large individual buildings. The building has to be a visible symbol of its purpose, a headquarters for out-nursing and other home services, and provide just enough clinical space to accommodate the expected attendance.

Next in importance are requirements for expansion, flexibility, and multiple use. Populations, programs, and the centers themselves change. Expanding needs may be met by providing for additional construction at the time initial projects are planned (additional stories,



# CENTERS

wings, etc.), or by including unassigned space. Flexibility can be aided by using standard demountable partitions in many spaces. Multiplicity of use is principally an administrative problem in scheduling clinics, etc.; however, circulation, areas, and other planning factors have to be studied in light of this problem.

## Future trends

The exact direction which community health programs may take is difficult to define, and depends partly upon conditions in any given locality. As the prevalence of disease varies in different localities, facilities likewise vary. Thus, typhoid or malaria control are required in some places and not in others. Public instruction in home diet and in food-deficiency diseases will vary with local problems. In the same manner, types of disease combatted in health centers may change radically.

Certain maladies which are prevalent, though not, as far as is known, of contagious or epidemic nature, are in some quarters suggested as falling within the future health center's province. These include, among others, cardiac ailments, mild mental disorders, and arthritis. Some may necessitate different types of clinics or equipment. Others may be cared for in the present accommodations.

Another possibility, not probable in some localities in the near future under existing laws, is a closer coordination of hospital and health-center facilities. Structures and organizations established by the Kellogg Foundation, shown later in this study, offer an example. In large cities, however, it may remain a difficult task to integrate the two services to the extent of incorporating one within the other, as the whole problem is much larger. This is due to the size, composition, and backgrounds of the population served; to difficulties of administration; and to differences in policies and the need for decentralizing one service in order to humanize it, while the other is concentrated for efficiency.

The following survey is based upon experience of numerous authorities and organizations in the field, including Charles F. Wilinsky, M.D., Director, Beth Israel Hospital, and of the Health Units in Boston, Mass.; Harry E. Handley, M.D., Ass't. Director, Div. Public Health, Commonwealth Fund; Claude Munger, M.D., Director, St. Luke's Hospital, New York City; Frank G. Boudreau, M.D., Director, Milbank Memorial Fund; Wilson G. Smillie, M.D., Cornell University; Reginald M. Atwater, M.D., Exec. Sec., American Public Health Association; John L. Rice, M.D., Commissioner, Edwin A. Salmon, Consultant, and Kenneth D. Widdemer, all of Dept. of Health, New York City; and others.

## FUNCTIONS OF HEALTH CENTERS

- (1) **Child Health**  
Teaching mothers how to keep children well; immunization, vaccination
- (2) **Dental Hygiene for School Children**  
Examination, advice, prophylaxis, fillings, extractions
- (3) **Eye Service for School Children**  
Refractions, examinations, prescriptions, checking glasses, advice
- (4) **Tuberculosis Service**  
Diagnosis, consultation service; aid in finding unknown sources of infection; serves those without private physician; assists physicians by providing free diagnostic service
- (5) **Venereal-Disease Service**  
Case-finding, consultation; treatment to prevent spread of disease; aid in following up and returning cases to private physicians; supplying free drugs to physicians for needy patients
- (6) **Nursing Service**  
Headquarters for workers in various services and home visiting
- (7) **Supplies**  
Distributing department supplies, and biological products for private physicians
- (8) **Health Education**  
Center of public-health education in district (disease prevention, general health promotion); public education in clinics, auditoriums, homes (may need bulletin boards, poster space); also training staff personnel, medical and nursing students (may require only room for trainees, or classrooms and teaching equipment)
- (9) **Co-operation with Local Agencies**  
Local offices for closely allied voluntary social agencies; essential is co-operation with private physicians, dentists, non-official and citizen groups
- (10) **Other Department Services**  
Main or branch offices for health department (district administrator and staff, district quarters for laboratory; food, sanitary inspectors; child examination for working papers; occasional anti-rabies clinics)

## TYPES OF URBAN CENTERS (Developed by N. Y. C. Dept. of Health)

- (1) **District Health Centers**  
Contain departmental waiting rooms; clinics (chiefly diagnostic, some treatment); health offices; nurses' offices (departmental and visiting); facilities for health education, co-operating agencies and groups; auditorium for 200-300 people; exhibit space; lunchroom with small kitchen
- (2) **District Substations**  
Smaller than (1), contain similar services as locality demands
- (3) **Child-Health Stations**  
Small, sometimes rented quarters; facilities for children, maternity, well-baby programs; baby-carriage shelter; small office
- (4) **Health Center with Borough Office**  
Additional offices for borough-wide services: birth and death records, permits; sanitation; food, drug control; disease control; cardiac clinic. Applicable principally in New York City
- (5) **Health and Teaching Centers**  
For instruction in public-health practice and preventive medicine, in co-operation with medical schools. Staff training also aided. Requires offices, classrooms, staff facilities as the school program demands

## TYPES OF RURAL CENTERS (County or Regional Buildings)

- (1) **Preventive and Educational Center**  
Similar to type (1) of Urban Buildings, but smaller, with provision for more field work over greater distances. Facilities for regional offices also included. May have substations for clinics, educational work if area is extremely large.
- (2) **Health Center with Hospitalization**  
Like above, but includes full hospital facilities, with some departments (laboratory, X-ray suite, etc.) often used for both purposes. Buildings for hospital and health center or department sometimes separate

\*These are Health Department branch offices, coordinated with other community health activities.

# THREE DIFFERING TYPES OF HEALTH CENTERS

Two types of rural organizations and one urban department are presented in the following portion of this study. While these do not present a complete picture of the field, they serve to indicate the wide range of accommodations and the varying ways in which health-center requirements can be met. Included are a group of centers in the South and East, whose construction was aided by the Commonwealth Fund; New York City's comprehensive program; and developments in rural Michigan, where the W. K. Kellogg Foundation is active in the field.



## CENTERS BUILT FOR RURAL PROGRAMS

THE DIVISION of Public Health of the Commonwealth Fund has been active for several years in aiding the establishment of rural health programs. As a part of each individual program, it assists in building a community health center. Financial aid and assistance in planning the entire program reach communities which otherwise would have no means of satisfying their needs.

The program includes preliminary work of ascertaining local regional needs, of stimulating the desire for better health facilities by means of health educational work, and of establishing a regional public-health organization. All of this is done with the co-operation of local health authorities, welfare organizations, medical and civic groups, and individual practitioners. When the program has reached a point which is considered opportune, financial and architectural aid is furnished to provide a health-center building.

In the course of this entire program, local organizations—regional and municipal—are required to assume a certain amount of responsibility, varying from co-operation at the start of the program to complete responsibility several years after completion of the health-center building. By these means, self-reliance, and pride in both the program and the center as a visible expression of it, are fostered.

**Development and location** of local health programs follow, in general, a common pattern. The regional unit adopted for rural areas is the county. Each program and center is designed to serve the population of the complete county, which may vary in size from 30,000 to 70,000 persons. Most of the Commonwealth Fund's public-health work has been centered in the South (Mississippi and Tennessee). At least one program has been undertaken in Massachusetts. Centers have been built in

Blountville and Trenton, Tenn., McComb and Meridian, Miss., and Ayer, Mass.

In certain cases, when the county seat is not the largest municipality, or the region served is of great extent, the center may be located in the county seat; subcenters in distant small cities are used as field stations. So far, subcenters have not required a building; leased space has proved adequate.

In most cases functions making up the program include provisions for more efficient administration of the health department, public-health nursing service, sanitary inspection, educational programs, and special programs for control of diseases which are prevalent locally. These may include tuberculosis, venereal diseases, diphtheria, etc. Maternal and infant welfare constitute another active phase of the work.

One activity with which considerable difficulty has been encountered, particularly in the South, has been inadequate provision for assembling and compiling records. Desirability of extending public-health activities in various fields is often made evident by compilations of vital statistics—records of illnesses, birth and death certificates, burial permits, etc. Some states have no provisions for central bureaus to handle such work. Consequently, an important provision is adequate record-storage space within each center where records may be held until such time as a central bureau is established.

In some of the larger centers facilities for a public-health library are required, and in isolated cases there is need for dental hygiene service and provision for trainees.

**Building provisions:** While health centers established under this program are not, strictly speaking, standardized, there is a certain similarity among them. The structures are all small. In most cases they consist of a basement and single story. Because facilities are thus kept close to the ground, fireproof construction

is not used. Health centers are of wood frame, with brick veneer, and are sufficiently imposing to assume a certain importance in the rural municipalities in which they are located. However, construction costs are kept to a minimum. The largest building yet constructed cost approximately \$45,000.

**Plan type:** The typical Commonwealth health center has, on the first floor, administrative, nursing, and active-record space toward the front of the building, with access through to clinical facilities in a wing extending to the rear. In the basement are spaces for dead storage, an auditorium, and building services.

In the administrative area, separate offices are provided for the health officer, sanitary inspector, sometimes an assistant health officer, and for the head nurse. Other necessary rooms include a clerical and record space, office space for out-nursing service, and staff toilets.

The clinical space contains a waiting room, large and small clinical rooms, dressing rooms, toilets, and utility room. In the South the waiting room is commonly divided in half by

a folding partition in order to provide separate spaces for colored and white patients. In practice, however, this partition is sometimes not used. It is also common practice to provide separate toilets and dressing rooms.

The basement usually contains a simply decorated meeting room, a laboratory, space for exhibits, in addition to storage space for records, stock, etc., and the boiler room. There are usually a main outside entrance to the meeting room or auditorium and secondary outside entrances as local conditions require. No attempt is made to disguise piping or columns in the meeting room beyond locating such necessities where they cause little interference.

**Plan variations:** If a library is included, it is usually a part of the administrative area. Trainees ordinarily require only a single lounge and locker room. In some cases a special room is set aside for exhibits. The center at Meridian, Miss., shown on page 88, contains a shop for the sanitary inspector's use. Other facilities are sometimes combined or contracted as local conditions demand.



## MASSACHUSETTS CENTER IS BASEMENTLESS

Established with the aid of the Commonwealth Fund, this center in Ayer, Mass., was designed by the firm of JAMES GAMBLE ROGERS, Architect, and CHARLES CRANE, Associate. Since an auditorium was not needed, there is no basement excepting a small heater room.

DUE TO LOCAL conditions, this center departs from the Commonwealth "norm" in several ways. It was possible to eliminate the auditorium because public acceptance of health doctrines and the independent New England temper combined to render this facility unnecessary. Dental hygiene, however, was a necessity; records and clinics required only relatively small accommodations; a sanitary inspector had to be provided for.



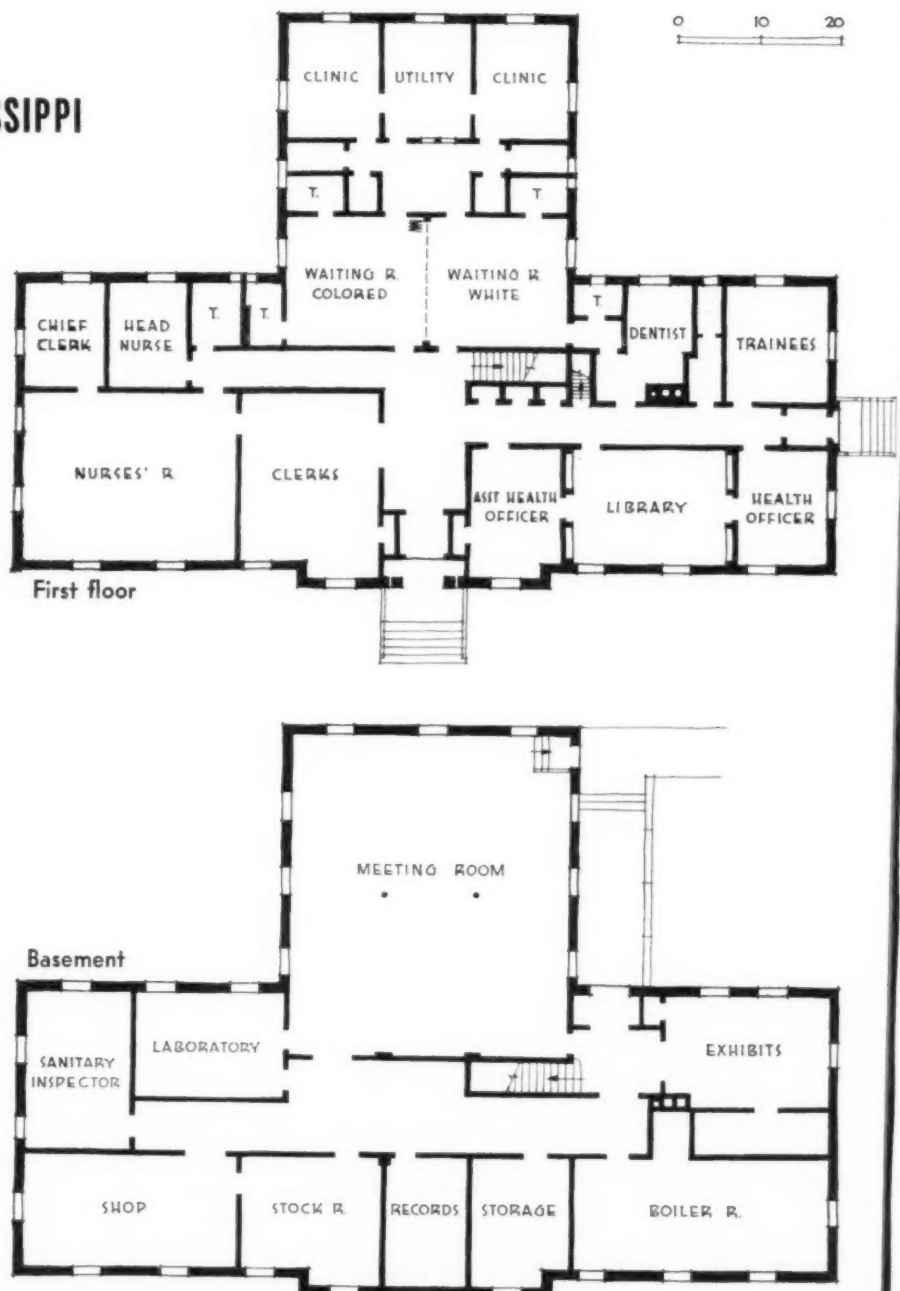




## PERSONNEL IS TRAINED IN MISSISSIPPI

The Lauderdale County Health Center in Meridian, Miss., is the largest yet completed in the Commonwealth Fund's program. All Commonwealth Health Centers are by CHARLES CRANE, associated with the firm of JAMES GAMBLE ROGERS.

IN ADDITION to being the largest of the Commonwealth Health Centers, the Lauderdale County Health Center is the one most recently constructed. In plan it follows the typical pattern, except that a trainees' room and a room for the chief clerk are included in the administrative area, and the sanitary inspector's office is in the basement adjacent to the shop. It was necessary to include a shop with facilities for well drilling since provision of wells for schools, public buildings, and some residences was locally required in order to assure a safe, adequate water supply. As in all centers of this type, there is direct access between clerical and active-record space and the nurses' workroom, since records are constantly used by the public-health nursing service. The library serves also as a public-health conference room for use by local physicians and societies, as well as health authorities. Trainees include administrators from adjacent districts, public-health nurses, etc.





Courtesy N. Y. C. Dept. Health

## A CITY PROVIDES FOR COMMUNITY HEALTH

IN NEW YORK CITY with 7½ million people living in an area of over 300 square miles, the problem of localizing health service is extremely complicated. Additional difficulties arise from the diversity of types which comprise the total population, its varying density, and numerous differences in customs, environment, understanding, and thought. The present program is the result of definite action taken early in 1934, which had its roots in experimental work started as far back as 1914 and 1917.

The city has been divided into 30 health districts for each of which a district health center is projected. Each area contains roughly a population of 250,000. In districts where unusual variations in population distribution occur, there are subcenters which offer specialized local services. Almost all of the 30 districts have supplementary child-health stations.

Two special types of health centers are included in the program: one to contain borough offices; and one to contain teaching facilities, in co-operation with local medical schools.

From the foregoing it can be seen that certain of New York City's problems will not be applicable to other portions of the country. However, a typical district health center might well serve as a model for average urban requirements. Health and teaching centers are already serving as inspirations for similar centers in various parts of the United States.

The child-health stations are sometimes housed in rented quarters. This type of provision is not ordinarily adequate. A program

of small one-story structures is now under way.

In New York City certain functions are centralized: compilation of records and vital statistics, laboratory facilities, etc. With these exceptions, every effort is made to decentralize the health service in order to bring the services offered close to the population served.

**Personnel:** At the present time the department personnel includes nearly 2,900 persons. Among these are approximately 500 physicians, 800 public-health nurses, 300 laboratory technicians, 300 inspectors, 100 dentists, many statisticians, X-ray operators, veterinarians, etc.

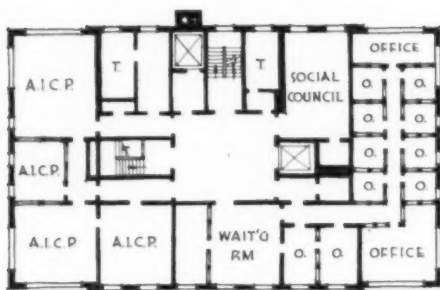
**Types of buildings:** The functions and types of buildings needed to house them in New York City are tabulated on page 85.

District centers are at present three- or four-story buildings with basements. Occasionally roofs are used for play areas. In every case steel structures are designed to accommodate additional future stories.

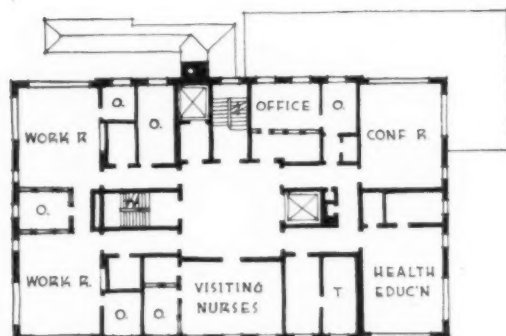
Ordinarily the basement and first floor house services to which the public must have direct access. These include auditoria or lecture rooms, exhibition spaces, emergency room, and the various clinics. On the upper floors are housed teaching facilities; offices for co-operating voluntary agencies; administrative offices for health and sanitary officials, nursing services, etc., and for local educational programs.

Typical clinic layouts include waiting rooms, administration and conference areas (some-

## NEW YORK CITY PROGRAM



THIRD FLOOR



SECOND FLOOR



FIRST FLOOR



BASEMENT

times part of the waiting room), examination and treatment rooms.

General lobbies are not intended to serve as waiting space. They are large enough to provide access to immediately adjacent clinics, elevators, stairs, and information desk. Each departmental waiting room usually has a nurse in charge who has a control desk or sometimes a small office. Occasionally a pair of waiting rooms for adjacent clinics is supervised by one nurse. Certain clinics require special accommodations, such as a toothbrush-drill room in the dental-hygiene area, weighing and dressing bins in the infant-welfare clinic, X-ray and pneumothorax space in the tuberculosis clinic. Partitions on upper floors are principally of the demountable type similar to those used in offices, in order to increase flexibility of space.

**Construction:** Since the buildings are multi-story, they are necessarily of fireproof construction. Steel framing and curtain walls of masonry are commonly used. Cost of district buildings completed or now under construction ranges from \$185,000 to over \$450,000.

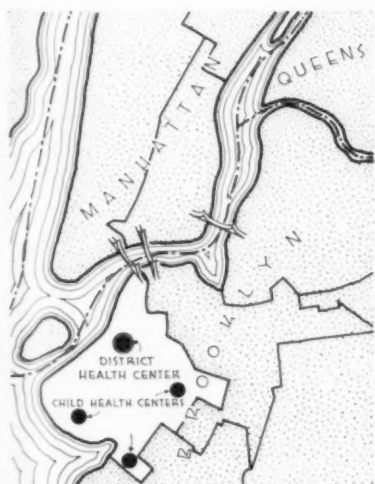
**Site selection:** Although municipal economy sometimes prevents, an effort is made to select a site for each of the health-center buildings which is adjacent to at least two means of inexpensive local transportation. It is considered desirable also that there should be playground facilities in the immediate vicinity, preferably on adjoining sites. Co-operation with the Park Department and school authorities aids these portions of the program. Other factors considered in site selection include area and density of population, morbidity and mortality rates for districts or subdivisions of districts, prevalence of various forms of disease, and similar factors indicated by vital statistics.

Above and at left, plans of New York's Lower West Side District Health Center: CARL F. GRIESHABER, Architect; WILL RICE AMON, Associate; EDWIN A. SALMON, Consultant. This center is typical of New York district requirements. The site adjoins school and playground.

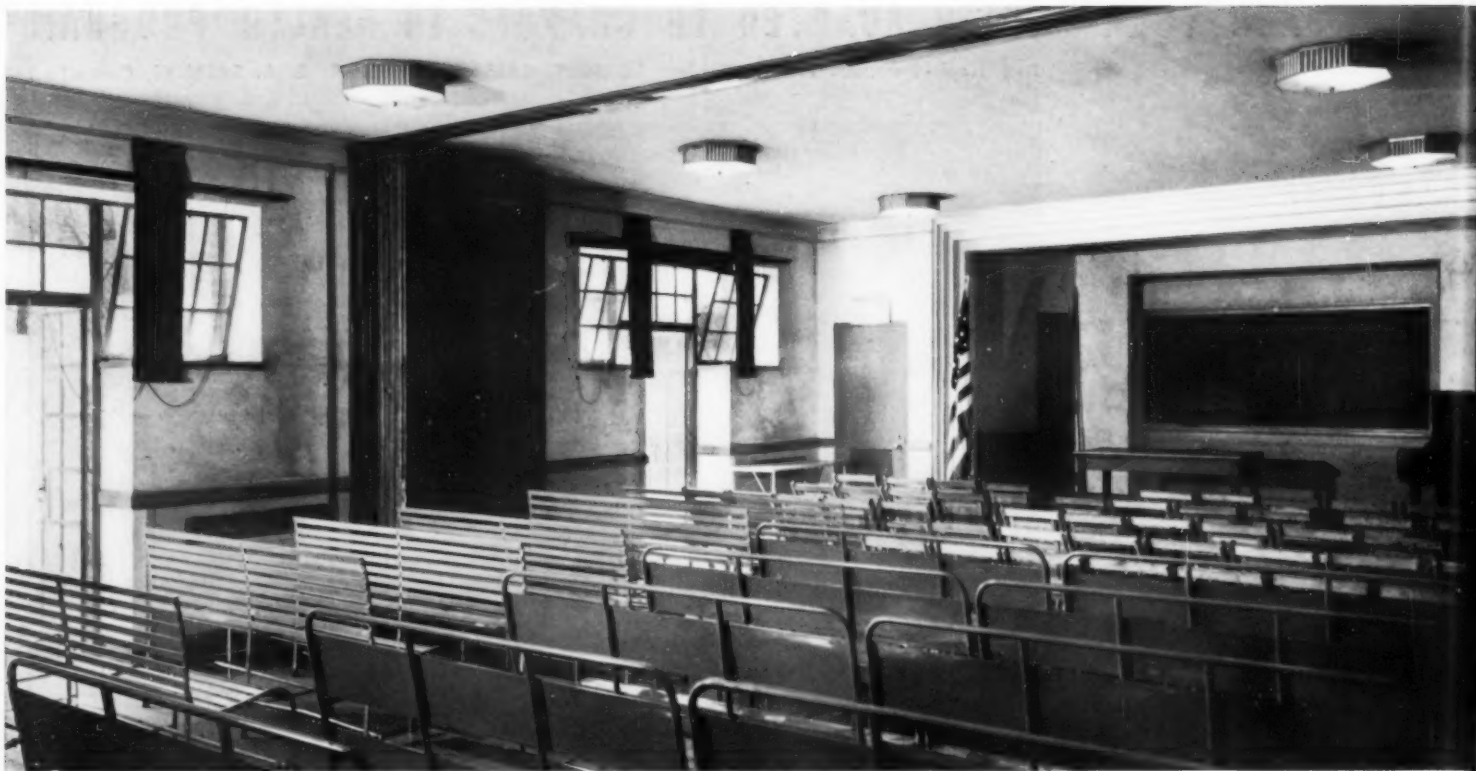


# NEW YORK CENTER ADAPTED TO CHANGES IN HEALTH PROGRAM

Red Hook-Gowanus Health Center; LOUIS E. JALLADE, Architect; E. A. SALMON, Consultant



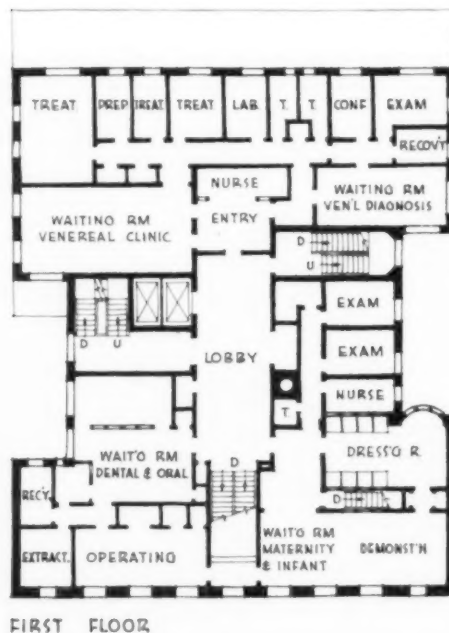
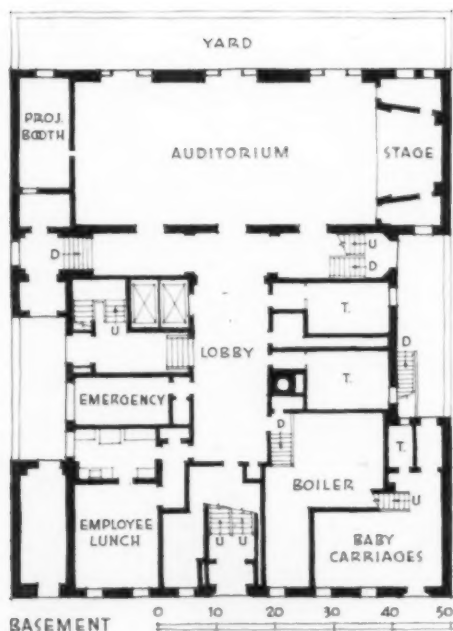
Red Hook-Gowanus center, sub-center, and adjacent districts



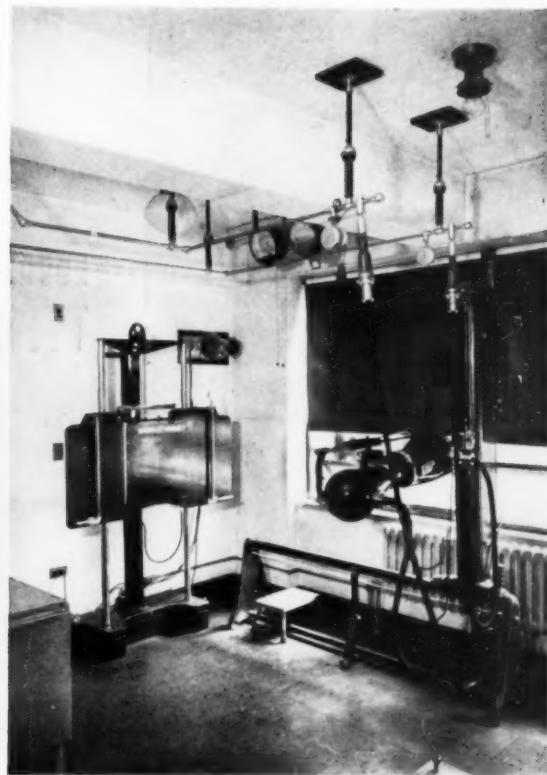
Auditorium of the Red Hook-Gowanus Center has direct access from the street through a separate entrance and courtyard, with elevator service to the first floor. Folding partition is used to subdivide auditorium into smaller rooms for conferences. Glazed doors open into rear yard and provide ample natural lighting.

## RED HOOK-GOWANUS HEALTH CENTER

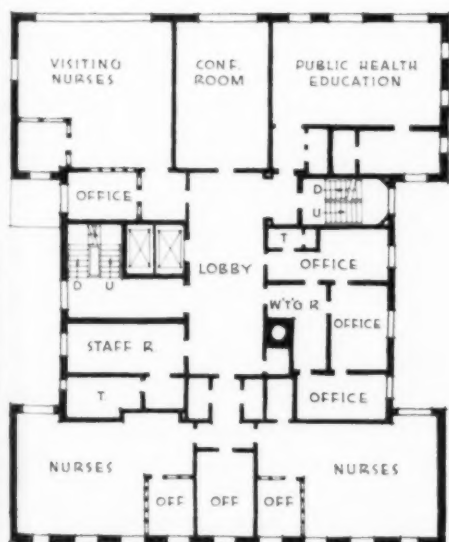
LOUIS E. JALLADE, Architect; EDWIN A. SALMON, Consultant



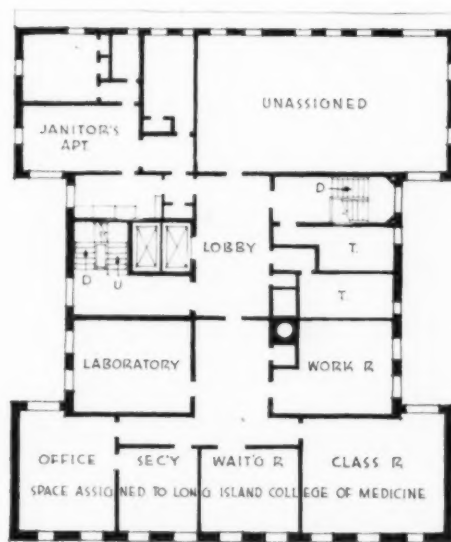
Three lower floors, including basement, house most of the activities to which public access is required. These include: in basement, auditorium, emergency room, and baby-carriage space; first floor, maternity and infant clinic, dental and oral clinic, venereal clinics; second floor, tuberculosis and X-ray clinic, eye clinic.



At left, weighing and dressing room in the infant clinic is on first floor, with supervising nurse's office separated from it by a glazed partition. Individual counter-high cubicles have supply drawers beneath them. At right, radiographic room on second floor, which has a series of dressing booths at one end, as shown in plan.



THIRD FLOOR



FOURTH FLOOR

Two upper floors contain administrative and other nonpublic areas: health-education office; headquarters for public-health and visiting nurses; staff offices, lounge, and toilets; janitor's apartment; space for co-operating agencies; and teaching facilities.

IN SOME RESPECTS, the Red Hook-Gowanus Health Center is not typical of buildings erected under New York City's program. Although not originally so planned, it functions as a health and teaching center. Considerable space—almost a full floor—is set aside for use by the Long Island College of Medicine.

Like other district centers, the building is of "fireproof" construction, with steel framing and curtain walls of face brick and terra-cotta tile. Floors are of terrazzo, linoleum, and asphalt tile. Portions of the building are acoustically treated. Interior partitions are of plaster block, or metal and glass. Sash are steel.

In the plans, close relationships are maintained between certain of the clinics. Those who attend a maternity clinic, for instance, may need dental attention, so these two units are placed conveniently side by side. Baby-carriage space is directly beneath the maternity and infant clinic, with a direct stair to the clinic waiting room. A single control point serves the two halves—treatment and diagnosis—of the venereal clinic.





## Local Requirements Lead to New TYPES OF RURAL HOSPITAL-HEALTH CENTERS

FOR THE PAST TEN YEARS the W. K. Kellogg Foundation at Battle Creek, Mich., has been co-operating with the people of seven rural counties in a health program which has resulted from the founder's particular interest in the advancement of the health, happiness, and well-being of children.

Activities carried on in Allegan, Barry, Branch, Calhoun, Eaton, Hillsdale, and Van Buren counties range all the way from protecting pre-school children against communicable diseases to providing health scholarships for special extension courses for school teachers, school-board members, parents, physicians, dentists, ministers, and others. Important in the program was the development of adequate hospital facilities. The various communities concerned are working toward coordinating local health departments and hospitals into workable units which provide for health needs far beyond the usual scope of a health program.

In the seven-county area there are now ten hospitals whose boards of trustees have requested the co-operation of the W. K. Kellogg Foundation in improving their services to the public.\* Of these ten, three—the three-story health centers at Hillsdale and Coldwater and the two-story structure at Allegan—were constructed with the help of PWA funds and of grants totaling approximately \$300,000 from the Kellogg Foundation.

All are community health centers in that they not only provide hospital services but improve the caliber of local medical service by:

- (1) bringing in members of faculties of neighborhood medical schools to study and confer with local physicians;
- (2) providing rural practitioners with up-to-date facilities for diagnosis and treatment;
- (3) making available X-ray and laboratory facilities (at the health center or in the home) at low cost;

\*These hospitals (all community health centers) are: Sheldon Memorial Hospital, Albion, Calhoun County; Allegan Health Center, Allegan, Allegan County; Hayes-Green County Memorial Hospital, Charlotte, Eaton County; Calhoun County Public Hospital, Battle Creek, Calhoun County; Community Health Center, Coldwater, Branch County; Pennock Hospital, Hastings, Barry County; Hillsdale Community Health Center, Hillsdale, Hillsdale County; Oaklawn Hospital, Marshall, Calhoun County; Wm. Crispe Hospital, Plainwell, Allegan County; City Hospital, South Haven, Van Buren County.

- (4) offering expectant mothers choice between hospital or home delivery with identical nursing care.

The whole program revolves about the family physician. To this end an extensive educational program for physicians is carried on at the health centers. Local practitioners' own patients are the subject for study. At times clinical discussions are held in patient's homes.

Libraries are housed in staff conference rooms, which are also used by local physicians for meetings with pathological and X-ray consultants. In addition each center includes as part of its hospital facilities modern equipment for fluoroscopy, X-ray diagnosis, laboratory facilities, basal metabolism, and electrocardiography. Patients may receive complete home laboratory service, the only extra cost being the technician's mileage. In addition, one center offers home X-ray service on the same basis.

**Home maternity nursing "out-service":** The Kellogg Foundation centers are unique in that they offer a complete maternity nursing out-service for those patients who wish it. By this means they reach a large proportion of the community who, because of finances, acute illness, distance, or personal reasons, would not ordinarily come to a hospital.

These nurses require a combined utility room and headquarters office in the hospital.

**Health aspects:** Beyond the extension to private practitioners of facilities not ordinarily available in the country, community health is furthered by a program of close co-operation between local health departments, hospitals, and private physicians. Though not yet fully developed, this program envisions work in preventive, diagnostic, and therapeutic fields, so that health officers—already responsible for prevention and control of mass disease or epidemics by vaccination, immunization, general sanitation, etc.—may eventually have a hand in diagnosing individual ills and insuring proper care. It is possible, too, that the home maternity nursing service may be extended into a general home nursing service.



## BRANCH COUNTY COMMUNITY HEALTH CENTER

One of the most recent of the Kellogg Health Centers is the Branch County Community Health Center, designed by LEWIS SARVIS, Architect.

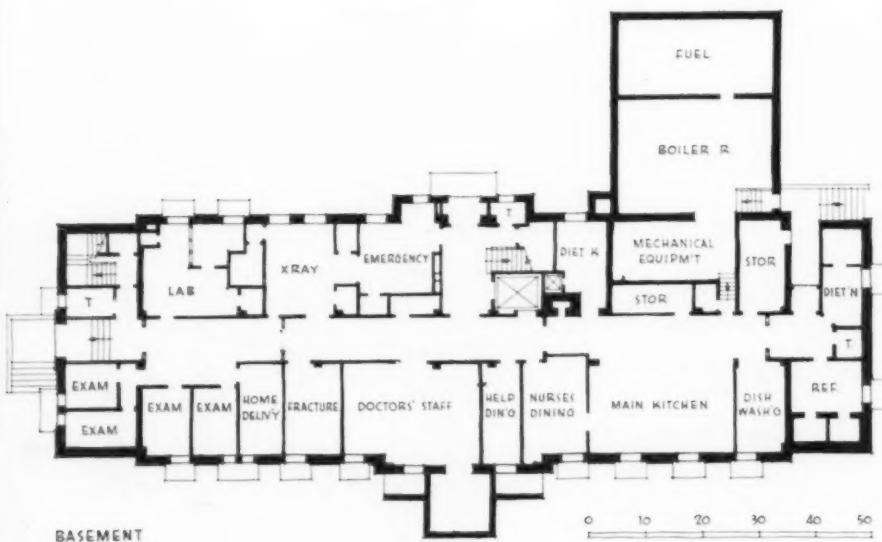
IN THIS BUILDING several distinct departures are made from conventional hospital planning. In the first place, the basement contains a rather complete outpatient department with which is also coupled space for the home nursing service. In the second place, operating units are placed on the first floor at one end of the building. This frees the upper floors for wards and rooms. Diagnostic units (X-ray and laboratory) adjoin emergency room, ambulance entrance, and outpatient department.



At right, typical four-bed ward in the hospital, showing method of providing privacy with curtains. Above, a nurses' station

**LEWIS SARVIS, Architect**

The structure is of reinforced concrete with face brick and hollow-tile exterior walls. The wood roof is supported on structural steel frame which is carried on an attic slab of reinforced concrete. The roof is surfaced with slate. Windows have double-hung aluminum sash with plaster jambs and terrazzo sills. All door trim is steel. Floors of operating rooms, bathrooms, utility and service rooms, and the entire basement floor are of terrazzo. Corridor and general room floors are rubber tile. Operating rooms have colored glazed-tile wainscots. Interior partitions are gypsum tile with smooth plaster finish; ceilings in corridors and work space are acoustically treated. Heating system is two-pipe, down-feed, vacuum steam system, stoker fired. Radiators are concealed under windows; operating rooms are automatically air conditioned. Toilets and utility rooms have air exhausts.



### Basal metabolism room





Operating room



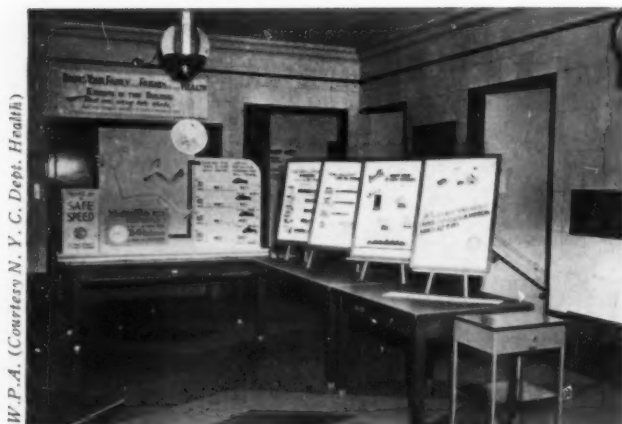
Nursery



Laboratory

# HEALTH-CENTER BUILDINGS

## 1: GENERAL PLANNING DATA



W.P.A. (Courtesy N. Y. C. Dept. Health)

Planned space is usually required for exhibitions.



Adolph Study

Nurses' workroom serves headquarters office.



Courtesy W. K. Kellogg Foundation

Utility room for preparing out-nursing materials

Data on this and the following pages have been assembled with the co-operation of Frederick Arden Pawley, Architect. They are intended for use as guides in preliminary planning, in determining types of spaces to be included, and in appraising area allotments. However, health and administration problems vary widely, and it will be necessary in most cases to adapt material here presented to specific needs.

### FACILITIES INCLUDED

Health centers planned to include the entire health administration of a district, urban or rural, in one building, offer the advantage of bringing health services close to the entire community, and of affording close correlation of local health, medical, and welfare work. In some instances, such as rural centers in which hospitalization and health programs are combined, there may be a need for separation due to differing types of work and widely varying structural requirements (including cost). Even in such cases, however, an intimate relationship between buildings which compose the center is highly desirable. Means of achieving this include adjoining locations on the same site, physical connections—passages, walkways, etc.—between buildings, and similarity of architectural treatment.

Some services, such as baby-health stations, manifestly require locations which enable all parts of the population to reach them easily; subcenters may be desirable for these localized services.

Within the center, areas are commonly grouped into two general categories: public, and nonpublic or official spaces.

**Public areas** include general waiting space, clinics and attendant special waiting rooms, dressing rooms, examination and treatment spaces, public educational areas, and such public spaces as are needed within the center in connection with health and sanitation departments, social service, etc.

It is considered good practice to group public areas, excepting small spaces intimately related to special departments, in one location, easily accessible from the street. It is essential that circulation be as simple and direct as possible, in order to make services offered immediately available to the public. This practice also facilitates control. First floors and basements, or wings either with separate entrance or direct access to the principal entrance, are desirable locations.

**Nonpublic areas** include offices for various functions of the health department, laboratories, offices for co-operating voluntary agencies, offices and classrooms for personnel education, and space for normal building services. This type of area does not require maximum ease of access, and can be placed on upper floors, in wings not directly in the line of public travel, etc.

### SPACE DETERMINATION

Exact determination of space requirements is best done in consultation with health officials or others whose experience, both general and local, enables them to appraise local needs. In general, the number of departments, and space for each, may be expected to be greatest in urban localities, where land and construction are expensive (hence, each building must serve a larger share of the populace than in the country) and where administration becomes complex.

Other factors also enter into the question: The type of building (see page 85) as determined by the program and facilities to be offered may contract or expand building requirements. The type of community development, industrial, business, or residential; degree of homogeneity and relative permanence of population; social and economic status; extent to which local voluntary agencies, medical societies, etc., co-operate; and extent to which certain services are carried on within the building (as in cities) or in homes (as in some rural localities), are all of great importance. A tabulation of departmental provisions as percentages of areas in existing buildings is given on page 102.

ARCHITECTURAL RECORD TIME-SAVER STANDARDS

## 2: PUBLIC AREAS—WAITING, CLINICAL, EDUCATIONAL

### WAITING SPACES

In a departmentalized center, with ample and easily accessible departmental waiting space, the main waiting room may be in essence an enlarged corridor. In small centers, only a single waiting room is often all that is provided; in such a case, or when numbers of persons must be accommodated while waiting for clinics to open, benches and similar waiting-room equipment are essential.

In the latter case, space may be provided on a square-foot-per-person basis. In the hospital field, one means of determining space has been set forth: allow 12 to 15 sq. ft. per person for 85% of the expected attendance. This allowance includes space for relatives or friends of the patient, aisles, etc. In the health-center field, no similar rule-of-thumb has been formulated.

**General waiting space** requires direct access to information desk, pharmacy (if any), check rooms and toilets, telephones, departmental waiting spaces, stairs and elevators to offices, and to auditorium and exhibit space. An important adjunct is a room or shelter for baby carriages, convenient to child and maternity clinics, and with no steps between the room floor and sidewalk level outdoors. Space allowance here may total 10 sq. ft. per carriage. This room may be at basement or first-floor level. The general waiting room may also contain spaces for exhibits as part of the health-education program.

Further accommodations may include supervised play space for children who accompany those who attend clinics, and provision for isolation of patients found to have communicable diseases.

**Departmental waiting spaces** are needed to segregate certain diseases, to ease load on main waiting room, and to speed up handling of patients. Small adjacent clinics may share departmental waiting rooms. Large health centers may have separate waiting rooms for:

- Tuberculosis and X-ray
- Venereal disease diagnosis
- Venereal disease treatment
- Dental and oral hygiene
- Maternity and infant welfare
- District administrative offices
- Offices of co-operating voluntary agencies
- Medical school offices

### PUBLIC TOILETS

Building codes govern locations and number of fixtures. In large buildings toilets are needed on floors with most traffic (auditorium, clinics, waiting room, staff, medical-school quarters). In the South separate toilets are required for white and Negro patients.

### CLINICAL SPACES

**Maternal and infant welfare** clinics usually offer educational and infant hygiene services only. Work in rural areas is often done in the home, which reduces the necessity for space in the center. Included in the clinic are a waiting room; control desk; a conference, demonstration, and exhibit room; waiting and dressing rooms with counter-high cubicles for babies; examination rooms and, occasionally, a small laboratory. Waiting and demonstration rooms may be combined. A nurses' office is required, usually overlooking the waiting and dressing room through a glazed partition.

**Tuberculosis and X-ray:** In the health center a certain amount of treatment of tuberculosis, as well as diagnosis and case finding, is commonly practiced. Solaria are now relatively unpopular; pneumothorax treatment is almost universally accepted.

Fluoroscopic work for diagnosis is usually included in all health-center buildings but the provision of a complete X-ray service is often too expensive. Such facilities are often provided in a central structure, or used in co-operation with local hospitals. Where out-services are a part of the program, portable X-ray facilities may be used.

Spaces included in a tuberculosis clinic are waiting room, control desk, and facilities for storing supplies and records, and for taking histories; a series of examination rooms, fluoroscopy room, dressing cubicles; conference rooms for nurses and social workers, doctor's office, small local laboratory (may use centralized laboratory), toilets for patients and staff; and in some cases examination rooms for nose and throat ailments.

**Venereal disease** clinics include separate waiting rooms for diagnosis and treatment, often with a single control for both. The diagnostic clinic contains a conference room or doctor's office, examination rooms, and recovery rooms; it has separate toilets for men and women, independent of those in treatment clinics.

Treatment clinics include a room for group treatment with cubicles, curtained spaces or rooms for individual treatment, a laboratory, and a sterilizing room. Doctor's office may be identical with that used for the diagnostic clinic.

**Dental and oral hygiene** clinic includes facilities for pre-natal maternal care, care of pre-school children, and, if complete facilities are not provided in schools, some phases of the school program. Work in this department, as in many others, is to a great extent

(Continued on page 100)



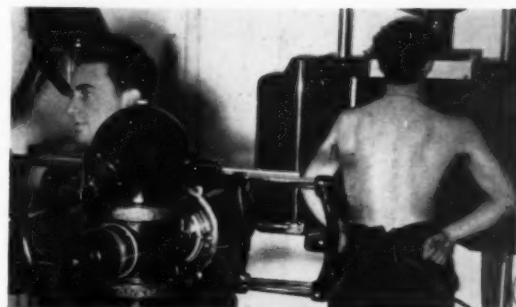
Information desk in main waiting lobby

Study



Baby-clinic supervisor's room overlooks nursery.

Study



Above, fluoroscopy; below, dental equipment. Both require few structural provisions.

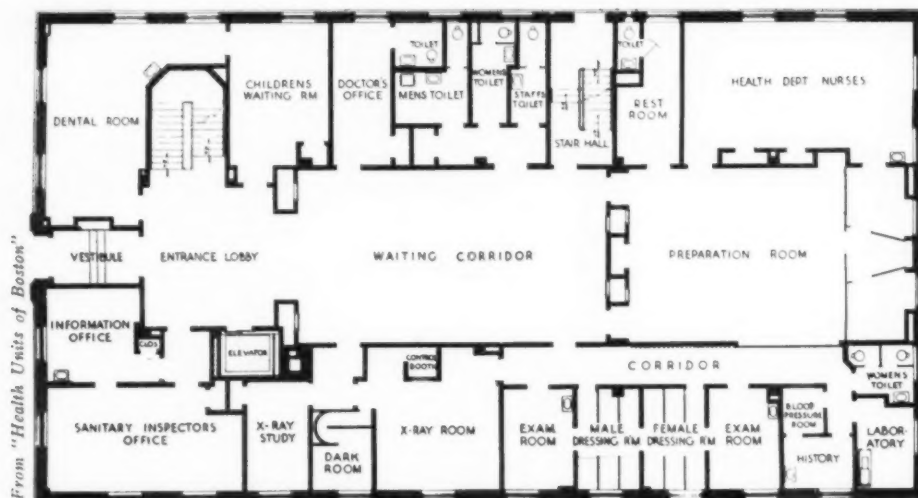
N. Y. C. Dept. of Health



Courtesy Promchew Electric



## HEALTH CENTERS—2: PUBLIC AREAS (continued)



Top, public floor of Whittier Street Health Center, Boston, Mass.; Coolidge, Shepley, Bulfinch & Abbott, Architects; Charles Wilinsky, M.D., Consultant. Center, public floor, typical New York City center; Edwin A. Salmon, Consultant. Left, clinical and emergency facilities on basement floor of Allegan Health Center

educational. Necessary space includes a waiting room with control desk; room for toothbrush drill; and dental office, with which may be combined an operating suite for emergency cases. This suite requires an extraction room, dark room, sterilizing equipment, and recovery room.

**Eye clinic** is chiefly a children's refraction service. Necessary space includes waiting room, examination room, and dark room.

### PUBLIC EDUCATION

**Health education** designed to promote the health of the public is carried on in all the public space previously noted. Classes, conferences, etc. are held in clinic space as a regular part of the clinic program. For this reason provisions for posters and other displays are required in all public space. Tack boards, bulletin boards, or other forms of free wall space are desirable.

Spaces specifically planned for educational purposes include special exhibition rooms and auditoria. These are usually grouped, perhaps have a separate exterior entrance, and not only serve the general public but also house meetings of local medical societies, citizen groups, etc.

Exhibition rooms may require special racks, tables, electrical facilities, and workrooms for displays. Auditoria are usually small—200-300 seats—with a small platform, dressing booths, and motion-picture booth. In some cases, it is possible to use auditoria in nearby community buildings, such as schools, etc.

Another facility often desirable is a small kitchen which may serve the triple function of diet training, preparing meals or other refreshments for community gatherings, and for staff lunches. Access is required from this suite to telephone booths, public toilets, check rooms, etc.

### RECREATION

It is considered desirable to include with the health center as many recreation facilities as a modest financial program permits. This is true particularly in cities. Roofs of health centers may serve as semienlosed recreation centers, or the buildings may be planned in conjunction with other community structures to take advantage of playgrounds, athletic fields, etc. Some centers have provided complete recreational facilities, even including swimming pools, gymnasias, tennis courts. One southern hospital, which functions to some extent as a health center, permits its extensive grounds to be used for picnics in order to further the integration of the health center with the daily life of the community.

ARCHITECTURAL RECORD TIME-SAVER STANDARDS

### 3: NONPUBLIC SPACES—ADMINISTRATION, VOLUNTARY AGENCIES, PERSONNEL EDUCATION

#### ADMINISTRATION

Administrative offices are usually grouped on upper floors or in separate wings. In urban institutions upper floors are used. Spaces here required are small waiting room, offices for health and sanitation officers, general business office, supply closets, and toilets. The food and drug inspection service may also require an office. In rural centers the number of offices depends upon the extent of the staff to be served. There is also the possibility of including a janitor's or building superintendent's apartment.

Much space is necessary for records. These include not only records of clinic patients but vital statistics of the health district. While some states or municipalities have at present organizations whose duty it is to keep and compile these records, there are many states which have not yet made such provision. In these cases, local health centers are often set up to take care of records until such time as transfer to a central office is possible.

#### OUT-SERVICES

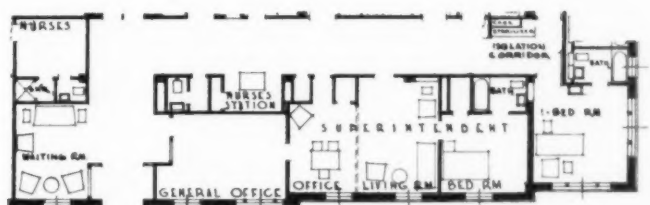
In some rural districts much of the work that is ordinarily carried on in clinics is transferred to homes. This extension of normal nursing and clinical facilities requires headquarters space for health-department nurses, social-service workers, etc. For this type of service, in city or country, nurses' workrooms (office space) and a utility room in which bandages, etc., may be prepared, are necessary. Sometimes included is an office for a supervising nurse. Some of this work may be handled by co-operating voluntary agencies. In some rural programs, space is allocated on the basis of one nurse per 8,000 population. In cities where out-cases are closer together, one nurse may be allocated per 10,000 population or more. Voluntary agencies have expressed desires for an average of 50 sq. ft. of workroom area per nurse. It is not always possible to obtain this figure.

#### VOLUNTARY AGENCIES

Space is commonly provided for all voluntary agencies that wish to co-operate with the health center. Such agencies include visiting nurses' association, district medical and dental societies, American Red Cross, welfare societies, religious charities, community service organizations, boy and girl scouts, overseers of public welfare, and similar local professional and citizen groups. In certain cases desk space for an executive secretary is the sole requirement. In other cases extended clerical space, private offices, and storage space for files and records may be

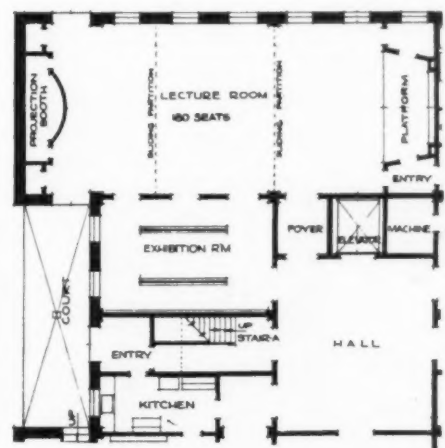


From "Health Units of Boston"



Kellogg Foundation

Top, upper floor of Whittier Street Health Center in Boston is devoted principally to office space. Center, Allegan Health Center contains an apartment for a resident superintendent with direct access to business office and waiting room. Right, exhibition and auditorium facilities in a typical health center in New York City. Notice small kitchen accessible to these facilities; it also serves an adjacent staff dining room.



Courtesy New York City Dept. of Health

needed. Since this program varies greatly, typical office partitions of the demountable type offer a means of increasing the flexibility of space allotted.

#### PERSONNEL EDUCATION

There is an increasing tendency to incorporate within the health center branches or at least branch headquarters of existing medical schools. Facilities required may range from small office, lounge, and toilet space to a suite of classrooms, etc.

Most of the work is likely to be done in

the clinics themselves in order that the students may learn by participating actively in the public-health program. In some cases laboratories will be required, although in many centers clinical or school laboratories are available to students.

A public-health library is highly desirable. It is also common for health departments to train personnel as administrators, doctors, nurses, etc. in the various phases of their work. Ordinarily this type of personnel education requires little beyond a lounge and locker room for trainees.

## HEALTH CENTERS—4: AREAS, BUILDING EQUIPMENT, FINISHES

W.P.A. (Courtesy N. Y. C. Dept. of Health)



Typical equipment in toothbrush clinic

Study



Demountable partitions increase flexibility.

Adolph Study



Typical health officer's suite

W.P.A. (Courtesy N. Y. C. Dept. of Health)



Display stands are needed for exhibits.

### SPACE ALLOCATION

Accompanying tables are from "District Health Administration," by Ira V. Hiscock (New York, The Milbank Memorial Fund). They indicate the varying importance, in terms of area, of the various departments in a health center. Exact areas cannot be given due to varying local conditions.

It is possible to approximate space requirements in clinics by determining the number of examination or treatment stations needed. This may be done by obtaining an estimate of the expected daily case load, and ascertaining how many physicians or nurses will be in attendance, how many each can handle per hour, and how many hours the clinic will operate daily. Consultation with local authorities is advised.

### EQUIPMENT AND FINISHES

It should be remembered that not all items in the following paragraphs are mandatory requirements. Local conditions, multiple use of areas, etc. may decrease or increase amount of equipment required.

**Waiting-room** equipment may include drinking fountain; waste receptacles; benches or chairs. There should be adequate light for reading. Poster-display stands are desirable. Walls and ceiling are usually plaster, painted cheerful colors. Acoustically treated ceiling is desirable, but not always attainable.

**Infant clinic** requires counter-high bins for dressing and examining infants. Here, also, acoustic treatment is desirable. **Maternal clinics** require dressing and examining-room equipment; also chairs, tables, counter, etc., for conferences. There may be need for typical utility-room equipment (sterilizer, work counter, storage space, etc.).

**Tuberculosis and X-ray clinic** may require lead-insulated walls, floor, and ceiling, if X-ray equipment is provided. Pneumothorax equipment is necessary if treatment is given in clinic. However, diagnostic equipment (fluoroscope) is most important.

**Venereal disease clinic** may require some duplication of equipment in diagnosis and treatment divisions. Utility-room equipment (sterilizer, counter, storage space, sink, etc.) is required.

**Dental and oral clinic** needs basins, etc., for group toothbrush drill; dental chairs for examination; extraction-room equipment; sterilizer; darkroom equipment. Acoustically treated ceilings are desirable.

**Dressing booths** may be completely partitioned cubicles, or curtained spaces. Provision for ventilation and cleaning, possibly by means of dwarf doors or dwarf partitions on the side towards the examining room, is important. Seat, mirror and shelf, gown cupboard, clothing hooks, and lighting fixtures are desirable.

Distribution of Total Floor Space in Los Angeles County Health Centers

SERVICE	PERCENTAGE OF AREA	
	Nine Centers	East Side Center
Administration	6	4
Medical social service	18	20
Maternal and child hygiene (including conference rooms)	26	21
Inspection	3	5
Public-health nursing	4	6
Communicable disease	4	4
Laboratory	2	1
County welfare	6	5
Halls, corridors, and stairways	19	21
Lavatories	3	2
Heating plant and shop	2	1
Storage	5	2
Garage	2	0
Auditorium	0	8

Distribution of Total Floor Area of a Typical New York Health Center

SERVICE	PERCENTAGE OF AREA
Administration: Health officer, secretary, and conference	4
Child hygiene (including baby conference and maternity)	5
Dental and oral hygiene	5
Venereal disease	6
Tuberculosis and X-ray	10
Public-health nursing (including visiting nursing)	8
Health education	3
Auditorium, exhibits, etc.	8
Co-operative agencies	14
Stairs, halls, elevators	21
Boiler room, lunchroom, janitor's apartment	16

ARCHITECTURAL RECORD TIME-SAVER STANDARDS





● Fairmont General Hospital, Fairmont, West Virginia. L. D. Schmidt, Architect. Wm. M. Clark & Co., New Castle, Pa. Plumbing Contractor

Before you select the flush valves for hospitals, hotels, apartments, schools and other buildings where noise reduction is an important part of modern design, we should like to have you read this advertisement which appeared recently in Hospital Management.  
**THE IMPERIAL BRASS MFG. CO.**

## "Everyone comments on how quietly our flush valves operate"



● Miss Marie Robertson, R. N., Superintendent of the Fairmont General Hospital.



● Tests made by an independent research laboratory show that Watrous SILENT-ACTION Flush Valves eliminate an average of 88.5% of flush valve noise energy.

These valves—alone among all silent-type flush valves—have no screens, shot or mufflers of any type to become clogged. This assures silent operation that stays silent; insures against maintenance problems. Available in diaphragm and piston types.

**H**ERE is what Mr. H. H. Rose, President of the new Fairmont (W. Va.) General Hospital has to say after observing Watrous SILENT-ACTION Flush Valves in use in their new building:

"In our experience in hospital administration we have found that patients are apt to be annoyed by little things that almost escape attention on the part of the staff. When we were building our new hospital, we decided to analyze every possible noise source and eliminate it where practical.

"One of the details we studied was flush valves, and we discovered somewhat to our surprise that ordinary flush valves did make more noise than we had thought and that such noise was transmitted much farther than we had realized.

"We therefore decided to install Watrous Silent-Action Flush

Valves and our experience with these valves has been most satisfactory. They are unbelievably quiet—so quiet in fact that a nurse can flush a toilet without awakening a patient in an adjoining room. Everyone here has commented on how quietly our flush valves operate and some of the patients have also mentioned it.

"After our experience here, we don't see how any new building or modernization program could be considered up-to-date unless silent action flush valves were installed."

Fairmont General Hospital,  
H. H. Rose, President.

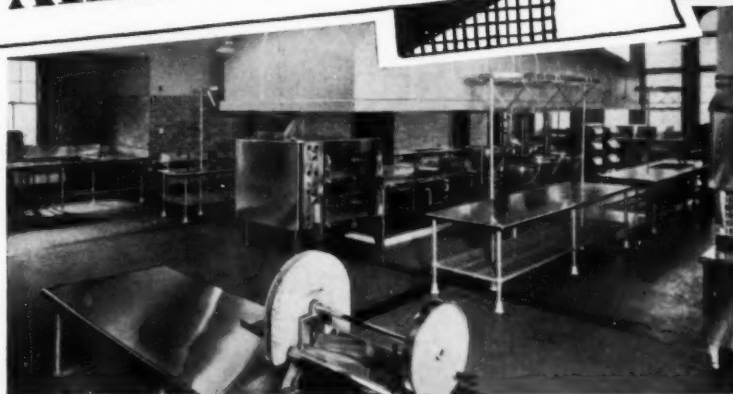
The cost of using Watrous SILENT-ACTION equipment in either new or old flush valve installations is extremely small. Before you complete your plans or specifications, we believe you will be interested in getting complete details. Write for our new bulletin, "A Scientific Method of Silencing Flush Valves."

THE IMPERIAL BRASS MFG. CO., 1240 W. Harrison St., Chicago, Ill.

# **Watrous SILENT-ACTION Flush Valves**

# HOW TO KEEP HOSPITAL EQUIPMENT FROM AILING...

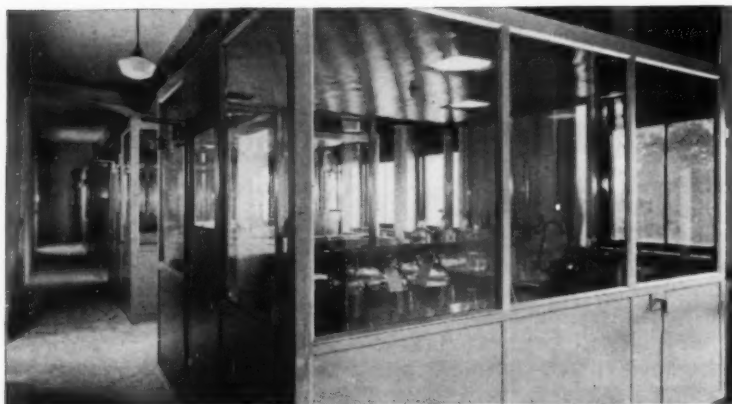
*You assure lasting health  
and enduring strength  
when you specify...*



## **MONEL for the KITCHEN**

In the Homer G. Phillips Hospital at St. Louis, Mo., the food service department is equipped throughout with Monel. This view of the main kitchen shows heavy duty ranges, sinks, work tables, warming ovens, etc., all of which are made of Monel. Equipment made of Monel is easy to keep clean and sanitary. And because Monel is strong and tough, it assures years of trouble-free service.

• • •



## **MONEL for the LABORATORY**

A first essential to the preparation of glucose and pollen serums is, of course, absolute sterility. So in these cubicles devoted to that purpose in the Army Medical Center at the Walter Reed Hospital, Washington, D.C., Monel plays an important part. Exteriors of the cubicles are made of steel, but the interiors are lined with solid Monel sheet, thus contributing to cleanliness and sanitation, as well as economy of maintenance.

• • •

In numerous types of buildings, large and small, Monel is being employed in an increasing number of structural applications as well as for equipment. These applications are listed and classified in a new booklet "Rustless Strength in Vital Spots." A copy of this booklet will gladly be mailed on request. Simply write to:

**THE INTERNATIONAL NICKEL COMPANY, INC.**  
67 Wall Street New York, N. Y.



**MONEL for the MORTUARY**—Even in this department cleanliness and sanitation can be achieved without sacrificing the sturdiness and durability desirable in hospital equipment. This mortuary refrigerator at Coney Island Hospital, for example, is equipped with doors, trim and trays all made of Monel. This silvery metal resists corrosion by hospital solutions, has no coating to chip, peel or wear through, and is exceptionally strong and tough. It thus assures long, economical service as well as ease of cleaning.



# MONEL

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ARCHITECTURAL RECORD

# A Hospital Expert



## speaks of OIL BURNING SYSTEMS

**CHARLES F. NEERGAARD**, *an expert on Hospital planning and equipment and consultant on many of the country's finest Hospitals, says of Oil Burning Systems:*

"A hospital should be essentially a clean, quiet building. The use of oil burners eliminates dust and noise which inevitably accompanies the delivery of coal and the removal of ashes. The comfort of the patient demands a reliable and properly controlled system of heating. It has been my experience and that of the engineers with whom I have been associated that oil burning systems used in hospitals have proved dependable and efficient and where the Petro equipment has been installed it has given excellent performance in every respect."

Mr. Neergaard's comment discusses hospital heating with oil from the vital standpoint of hospital service. But operating costs present to hospital management a more difficult problem than is faced by managers in other fields because the nature and function of hospitals narrows the scope in which economies are safe or practical.

Therefore, the operating economy, as well as the reliable operation, of Petro burners is of particular value to hospitals. Further economies result from the notably long life of Petro equipment without frequent repair, readjustment, and replacement costs.

The desirability of such cost reductions is obviously not confined to hospitals, and these economies are matters of record and proof in thousands of Petro installations whether they use No. 5 industrial fuel oil or the heavier and cheaper pre-heated No. 6 oil with the Petro Thermal Viscosity system.

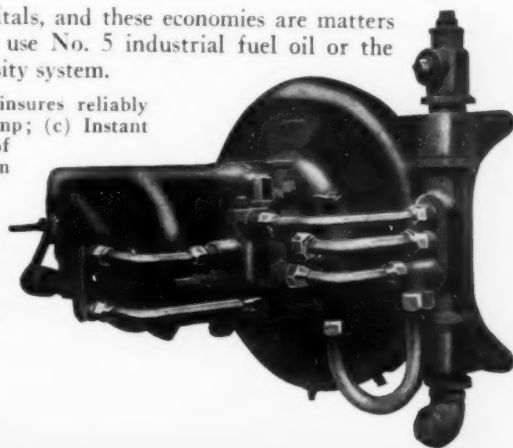
Using pre-heated No. 6 (Bunker C) fuel oil, the Thermal Viscosity System insures reliably automatic operation in: (a) "Cold starts"; (b) Fuel pumping—with integral pump; (c) Instant meeting of load fluctuations; and (d) Literally and wholly automatic control of the supply of oil to the burner at flow-rate and temperature correct for maximum combustion efficiency.

Unless a burner or system includes all four of these operating characteristics and performs them properly with pre-heated fuel oils, it would be an obvious misnomer to call it "automatic".

*Petro Industrial Burners for Automatic operation (with pre-heated No. 6, or No. 5 and lighter oils) are available in seven sizes, Models W2½ to W8, inclusive. Each burner is a self-contained assembly of motor, fan, pump, rotary cup atomizer and interlocked air and oil adjustments. The illustration shows how soundly this burner is designed.*

**CAPACITIES: to 100 gal. per hr.—336 boiler h.p.—  
47,000 sq. ft. steam E.D.R.**

Semi-automatic and Manually controlled Model W burners and "Mechanical type" units are also available to meet circumstances which do not require automatic operation.



*Petro's Engineering Division will gladly answer questions. The Petro Industrial Equipment Catalog will be sent promptly on request.*



**PETRO**  
for Hospitals



**PETROLEUM HEAT & POWER COMPANY**

**STAMFORD**

-- Makers of good Oil Burning Equipment since 1903 --

**CONNECTICUT**



# STAINS

for exposed locations . .



Cabot-Stained house, Beach Haven, N. J.  
Architects: Savery, Scheetz & Gilmore, Phil.



Cabot-Stained house, Minden, Nevada  
Architect: Russell Mills, Reno, Nev.



Cabot-Stained house, Menlo Park, Cal.  
Architect: John E. Dimciddie, San Francisco

Because of its vehicle of pure creosote, the best wood preservative known, there is no better finish for houses in exposed locations than Cabot's Creosote Stain. In the weathering grays and browns, its beauty actually increases with the passing years.



Free Booklet

## Stained Houses

Shows pictures of many prize-winning Cabot-Stained houses. Contains full information about both the *Creosote* and *Heavy-Bodied* Stains. Write Samuel Cabot, Inc., 1284 Oliver Bldg., Boston, Mass.

## Cabot's Shingle Stains

Creosote - - - Heavy-Bodied

### NEWPORT NEWS

Population (1930) 34,417  
Shipbuilding employees 11,500  
To increase after 6 months to 16,000  
To increase ultimately to 21,000  
Increase not to exceed 450 per month  
Average age - middle 30's

Small new buildings in units of 1 to 10 may accommodate 500 families  
500 individuals accommodated in rooms in existing houses at \$3.00 per week  
1,000 units needed in sale group from \$2,650 to \$2,700  
250 new units now authorized on alum clearance basis



Population (1930) 45,904  
Navy Yard employees 8,000  
To increase by Spring, '41, to 12,000  
To increase ultimately to 20,000

Housing Authority has completed plans for 2 projects housing 502 families at expected construction cost of 23,000 per unit and believes 2,500 additional units imperative.

Navy Yard Commandant has encouraged assembly of housing sites for sale to employees.

Plenty of unoccupied land is available for new housing and there are blighted and partially developed areas in the city which could be utilized.

### HAMPTON

Population (1930) 6,388  
Langley Field personnel, approx. 4,000

Location of Army Post at Fort Monroe and to the North, Langley Field, C.H.C. of the Army Air Force. Also at Fort Monroe is the Coast Artillery School.

Increase in personnel inevitable as result of large expansion of air training program. Data not available on housing need or expansion program.

### HOUSING NEEDS

1940 PROGRAM  
NATIONAL DEFENSE

HAMPTON ROADS  
REGION

Population (1930) 120,710  
Naval Training Station population variable; trained 50,000 men in last World War.

City Council opposed to formation of Housing Authority. Petitions circulated for reconsideration.

City is commercial center, easily accessible to all neighboring points with railroad lines and 90 miles of waterfront; premium on land. In addition to Naval Training Station, has Naval Air Station and Submarine Base.

Need for very low-priced housing for families of enlisted men. Naval Training Station is expanding into present residential areas.

Commandant of Training Station is alive to shortage of housing facilities. Two-family dwelling under consideration which is convertible to one-family house after emergency.

## SURVEY DETERMINES DEFENSE HOUSING NEEDS

Holden, McLaughlin, and Associates evolve procedure for anticipating housing shortages in areas vital to the national rearmament program

SUBJECT OF INCREASING concern in many circles is the predicted housing shortage in "defense areas" (i.e., districts with a heavy concentration of armament plants) as a result of the new national defense program. With experiences of World War I behind them, local officials and real-estate men are faced with two contradictory certainties—(1) an influx of workers into these areas will bring a sharp increase in the housing load which, with completion of the defense program, (2) will be followed by a sharp return to the normal.

Resolution of this contradiction is no simple problem; and to aid in it, Holden, McLaughlin, and Associates, New York architects, have recently

evolved a standard survey procedure. Taking the Hampton Roads region (see map above) as an example, they show that three steps are necessary in the analysis of the region's housing needs:

### I. Test Reconnaissance Survey

"A Test Reconnaissance Survey of this type may be quickly carried out by expert advisors acting in correspondence with representatives of local industry and of government yards, arsenals, posts, etc.

### II. Vacancy Check-up

"In each area the Reconnaissance Survey should be supplemented by a *Check-Up of Existing Vacancies*, with

(Continued on page 108)

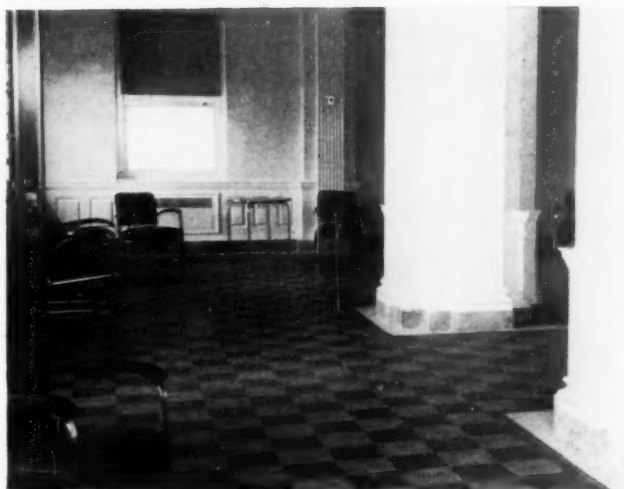
ARCHITECTURAL RECORD

# Sloane-Blabon Linoleum

## One of Your Dependable Aids



*A striking note is achieved by the use of special insets in this child's room of a home in Newton Center, Massachusetts.*



*Sloane-Blabon Battleship Linoleum was specified for installation throughout the new U. S. Veterans' Hospital at Dallas.*



*In the new Men's Dormitory at Ohio State University, Columbus, 10,000 square yards of Sloane-Blabon Battleship Linoleum was used.*



*Its durability, ease of maintenance and quietness made Sloane-Blabon Linoleum the choice for the offices of the Cities Service Company, N. Y.*

You can bank on Sloane-Blabon Linoleum to meet your most exacting requirements when it comes to the floor covering. Whether the primary requisite is one of design and color to accent a particular decorative note in home or apartment, or whether the practical qualities of long wear, resilience and quietness are paramount, there is a Sloane-Blabon Linoleum to fill the bill.

Wherever installed, Sloane-Blabon Linoleum offers the plus advantages of cleanliness and of ease and economy of maintenance.

An exclusive feature of Sloane-Blabon Linoleum is that it is delivered to the job mill waxed, a factor that means a substantial saving in your cost estimates to the owner.

You can confidently specify Sloane-Blabon Linoleum for any flooring need.

Sloane-Blabon Linoleum is giving satisfactory service in thousands of commercial, institutional and residential installations throughout the country. With distributors everywhere carrying complete stocks, it is quickly available whatever your specifications require.

# L I N O L E U M S

—BY—

# Sloane-Blabon

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**Only**  
**SISALKRAFT**  
**OFFERS THESE**  
**...MULTIPLE USES**  
**...EXTRA VALUES**

- 1 SIDE WALL PROTECTION** Over all sheathing, to provide positive protection against air, moisture and dust infiltration.
- 2 FLASHING** Sisalkraft is pliable, waterproof, tough, effective as a flashing around door and window openings.
- 3 UNDER FLOORS** Laid as a dry sheet under finish flooring, Sisalkraft helps to check buckling, warping and basement air and dust infiltration.
- 4 MOISTURE BARRIER** A vapor seal of Sisalkraft applied behind the plaster base of side walls, is an effective barrier against condensation.
- 5 CONCRETE CURING** Waterproof and airproof, Sisalkraft applied over fresh concrete, retards rapid evaporation—assures a hard, smooth concrete.
- 6 OVER SUB-FILL** A sheet of Sisalkraft over sub-fill keeps finish floors dry at or below grade.
- 7 PROTECTING FLOORS DURING CONSTRUCTION** Sisalkraft over finish floors, stairs, woodwork, protects against stains and damage.
- 8 PROTECTION OF MATERIALS** A covering of Sisalkraft assures materials being kept in condition for satisfactory performance in the job.

These are but a few of the multitude uses for Sisalkraft—more than a building paper. Write for complete file of information on this unusual material.

**The SISALKRAFT Co.**  
 205 W. Wacker Drive, Chicago, Ill.  
 New York • San Francisco




## Survey Determines Housing Needs

(Continued from page 106)

information on size, condition, type, and rent of family suites available.

### III. Schedule of Recommendations

"When such material has been assembled locally and has been placed in the hands of the Coordinator of Defense Housing, it should be possible for a *Schedule of Recommendations* to be drawn showing:

- (1) "Suites available in existing housing.
- (2) "Amount of additional accommodations which can be produced by minor alterations or shifting families.
- (3) "Amount of housing to be undertaken as 'quarters' under direct control of Army or Navy Departments.
- (4) "Amount of Housing including costs and rental range to be financed by U. S. Housing Authority, either on basis of low-rental rehousing of slum dwellers or under special provisions of amendments to Chapter 440 passed at the 3rd Session of the 76th Congress.
- (5) "Amount of housing to be undertaken by private industry with recommendations for finance and allocation of responsibility for execution. Rents or sale price should be indicated together with the size and character of the housing units which private initiative will be expected to provide.
- (6) "Expected duration of residence for additional workers in the defense area and relationship of housing created to permanent supply of housing for the area."

On this basis, Holden, McLaughlin, and Associates are able to estimate the housing shortage in the four communities of the region. Because of the relatively short period of time involved—current estimates place the completion of the defense program at between six and eight years—the amortization of new housing in this region must have special characteristics. "The three paramount problems which must be solved in connection with increased housing facilities in the Hampton Roads area are: (1) responsibility for initiation; (2) method of finance; and (3) disposition in the event of termination of the defense emergency prior to calculations."

Finally, the architects point out that "investigation in this district shows that in order to get housing started and carried out in as economical a manner as possible, the terms of finance and protection against risk must be made to fit conditions, even though this may entail new legislation and additional legislative revisions to remove some of the restrictions and conditions which are found to retard progress."

## WASHINGTON SEES IMMINENCE OF DEFENSE HOUSING SHORTAGE

**Bureau of Census to report on vacancies; legislators debate provision of funds, extension of facilities**

EVENTS OF THE PAST MONTH point to the fact that one of the most important problems affecting defense activities is the housing of defense workers. Signs of a growing housing shortage are multiplying, and a condition akin to that of the first World War may ensue. First signs of shortage appear in those places which in 1917-18 presented "housing headaches," such as the shipbuilding centers of Bath, Maine; Chester, Pa.; Newport News and Norfolk, Va.; Quincy, Mass.; and others. Even before the present increase in defense activities the occupancy situation throughout the country had improved to a considerable degree; and in most cities, with the exception of a few of the larger centers such as Chicago and New York, the vacancy rate was around 2%. With an expected increase in employment a serious lack of housing in these centers is imminent; and by the spring of 1941 the situation will probably become acute.

In view of conditions the Bureau of the Census decided to make a hand count of the vacancies reported in the 1940 census. Data will be for immediate use of the Federal agencies, and will not be made available to the public, according to present plans, because vacancy rates shown by this hand count will represent gross vacancies, which will include such items as dwellings unfit for use, dwellings for sale only, and dwellings vacant but not for rent.

The problem has many angles and is not susceptible to easy solution. On first thought the most obvious solution ap-

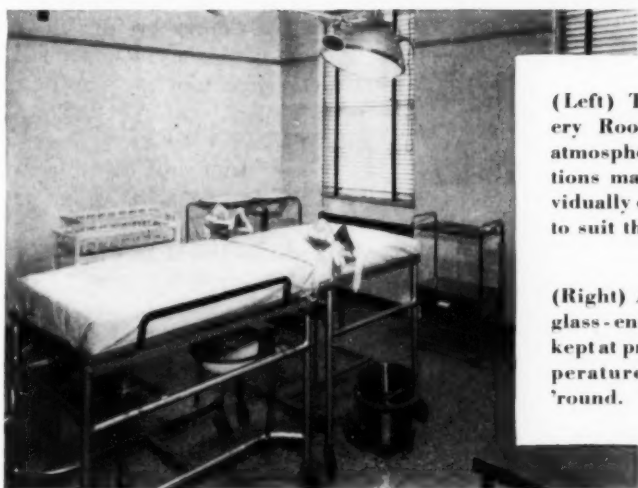
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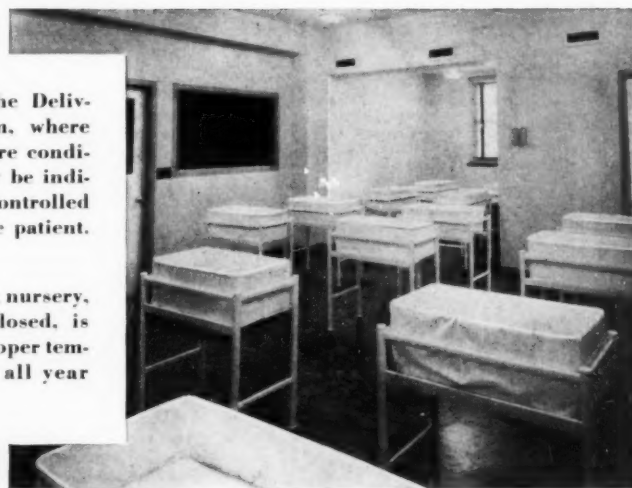
# Individual Weather Control Big Feature at St. Vincent's Hospital, Erie, Pa.



New Maternity Home assures exact temperature and humidity all year 'round in 4 delivery rooms, 3 nurseries, 3 isolation rooms, 3 other rooms, and in the ward for premature infants.



(Left) The Delivery Room, where atmosphere conditions may be individually controlled to suit the patient.



(Right) A nursery, glass-enclosed, is kept at proper temperature all year 'round.

MOTHERS, babies and staff today are benefiting in comfort and health from the Carrier installation in St. Vincent's new Maternity Home.

The system, which features individual year-'round control of temperature and humidity, embodies several other unique advantages. One of them is the fact that the air is used only once. Air in each room is replaced every 6 or 7 minutes with outdoor air, cleaned and properly conditioned.

Carrier experience—going back twenty-three years to the first air conditioned hospital—brings safety and comfort especially to the delivery rooms and the ward for premature babies. Here, Carrier accuracy of control is particularly important.

Maintenance of 55% humidity is important in preventing explosions due to static spark in operating rooms; while it has long been known that exact atmosphere control is essential for the well being of premature infants. Too, Carrier comfort, freedom from drafts, absence of dust, dirt and noise all contribute to aid convalescence, reduce mortality, and help babies to stay healthier and gain weight faster.

Two separate Carrier Systems supply approximately 6000 cu. ft. of air a minute. Except for the heaters in each room, the Carrier apparatus is entirely contained in a penthouse, saving valuable floor space.

Health factors are, of course, profit factors for a hospital. As in the case of the

St. Vincent's Maternity Home, Carrier Air Conditioning can be of great aid in setting up an enviable and inviting health record.

The Carrier Representative will be glad to work with you in planning air conditioning for a hospital or any other type of structure. Call him for the dependable and economical solution to any air conditioning problem. And remember, when you call Carrier, you call air conditioning by its *first name*.

Visit the Carrier Igloo of Tomorrow at the New York World's Fair, 1940 is the 50th Anniversary of what is now Carrier Refrigeration, and the 25th Anniversary of the Carrier Organization.



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**Carrier**

CARRIER CORPORATION  
"Weather Makers to the World"  
Syracuse, N. Y.  
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Please send me complete information on the health and profit possibilities of Carrier Air Conditioning for Hospitals.

Desk 91

Name .....

Company .....

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## Washington Sees Housing Shortage

(Continued from page 108)

appears to be the use of the vast credit facilities provided by the Federal Housing Administration and the Federal Home Loan Bank Board to erect low-cost single-family residences in the \$2,500 to \$4,000 class. Under present credit facilities the carrying charges on such houses range from \$18 to \$35 a month. These charges are within the incomes of the shipyards' new employees, with the exception of the unskilled laborers. However, it must be remembered that because of the depression,

during which many workers have been unemployed, they have been unable to accumulate savings necessary to make the down payment; also, that many of those who have saved \$400 or \$500—amounts necessary for a down payment—are not sure enough of the future to want to risk all their savings on home ownership.

Obviously, then, what will be needed will be rental housing projects which would provide the necessary accommodations at rents ranging from \$20 to \$40 a month. Where suitable land is available at reasonable prices these accommodations can be built at present

costs, using present techniques. The unwillingness of investors to put up the equity necessary to construct rental housing for a war-boom market is understandable. While it is true that present authorizations seem to assure the shipbuilding industries and other defense works of practically five years' capacity, this is too short a period to assure proper amortization of new rental housing and still maintain low rents. Investors naturally feel that at the end of the boom period they would be left with large groups of vacant properties. In other words, to the average real-estate investor the present defense boom does not seem to offer any greater assurance of continued income than did our business improvements prior to the present war.

Coupled with the above is the fact that before new housing can be built in some of the areas where it is needed, public facilities such as sewers, water, and streets are required. Most cities are rather wary of extending public facilities before the construction of property because of their tax and budget problems. In general, cities are no more prone to invest in extensions of public facilities than is private industry willing to invest equity in what is now considered temporary expansion for defense purposes. It is quite likely, however, that should the need become more acute, these facilities will be extended whether the housing is built by private industry or with public funds.

This has led to the United States Housing Authority's proposal to build, with public funds, unsubsidized housing which could be taken over by housing authorities and operated with subsidies when the expected depression does occur after the defense needs have been met. In this, however, the USHA appears to be stymied, temporarily at least, due to the lack of funds, except in instances of transfer of earmarkings.

The naval expediting bill (H.R. 9822. See AR, 8/40, p. 106) authorized the USHA to engage in housing for defense purposes. An attempt was made to include an appropriation of \$250,000,000 in the army appropriation bill (H.R. 10263) recently passed by the House of Representatives. A vigorous effort was made in the Military Affairs Committee to include the \$250,000,000, but after several attempts at compromise it was cut out altogether—Chairman May, of the Military Affairs Committee, stating on the floor of the House that he would see to it that the USHA would

(Continued on page 112)



Beautiful...Modern...Adaptable...Durable—AZROCK Tile easily claims these qualifications. And these pictures of the AZROCK installation in a modern tourist court amply illustrate what we mean. Here is beauty in a modern setting; adaptability too, for AZROCK is at home here as everywhere—in offices, homes, restaurants, stores and public buildings of

all types. As for durability, the many installations still in use after years of service attest to AZROCK'S ability "to take it" under constant and hard traffic.

AZROCK has two important, exclusive features: It is micro-cut, assuring a close, sanitary, easy-to-clean floor; an integral wax finish applied to AZROCK during manufacture simplifies polishing, adds to life of tile. And AZROCK's gentle resiliency means a floor comfortable to walk on, quiet. A variety of colors and sizes for any pattern or design.

# AZROCK

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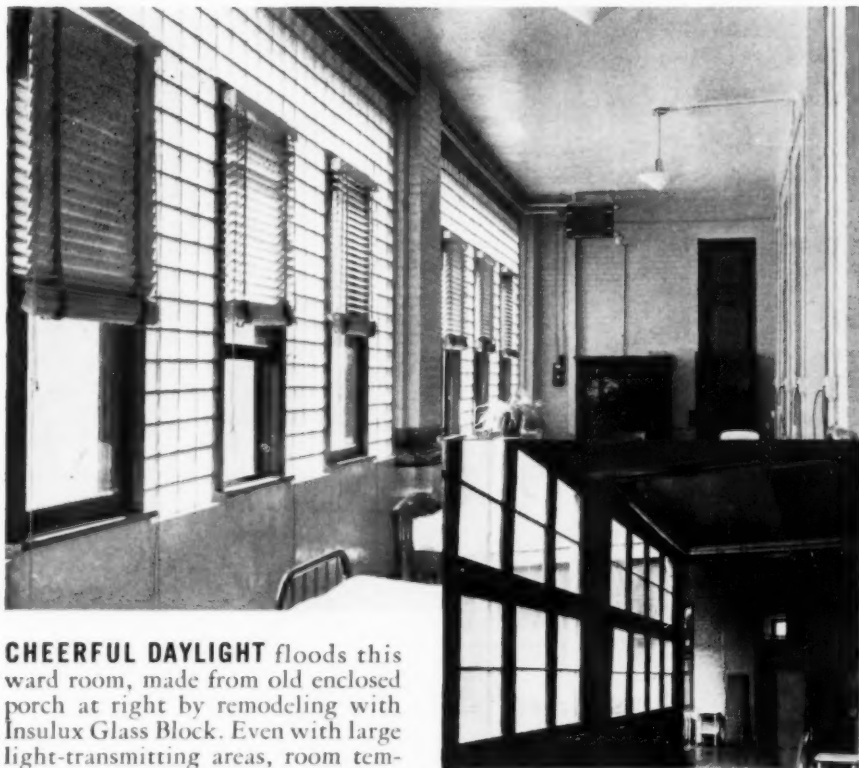
**Uvalde Rock Asphalt Co.**  
(In Business Since 1912)

General Offices: San Antonio, Texas;  
Mines: Blewett, Texas; AZROCK  
Plant: Houston, Texas; Distributing  
Contractors: principal cities of U. S. A.

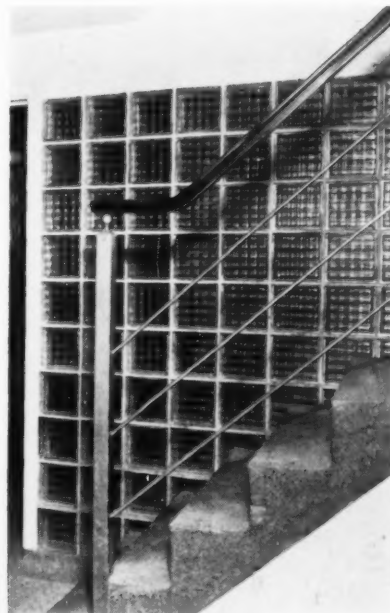


# INSULUX... NEEDED IN EVERY HOSPITAL

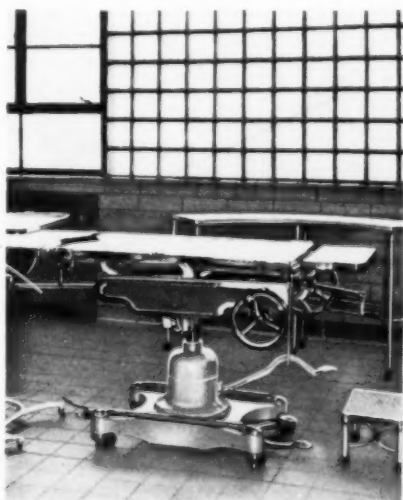
*to help increase efficiency and lower costs*



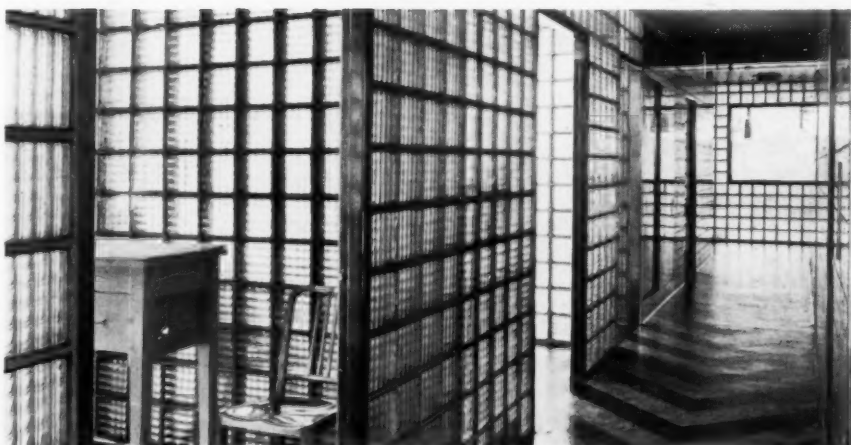
**CHEERFUL DAYLIGHT** floods this ward room, made from old enclosed porch at right by remodeling with Insulux Glass Block. Even with large light-transmitting areas, room temperatures are kept even and heating costs lowered by the high insulation value of Insulux panels. Privacy is maintained by Insulux Glass Block.



**STAIRS ARE MADE SAFER** with light from Insulux panels. Glass block cut maintenance costs — need no painting, are easily cleaned, are impervious to most chemicals.



**IN OPERATING ROOMS,** Insulux insures shadowless, diffused light without objectionable glare. Sealed panels eliminate air and dust infiltration . . . help prevent room-temperature variation. Operating rooms in old hospitals are easily remodeled with panels of Insulux Glass Block.



**CORRIDORS BORROW LIGHT** from Insulux Glass Block partitions, look more pleasant, need fewer electric lights. Insulux retards noise transmission. Partitions can be wiped sparkling clean with damp cloth, never need painting.

OWENS-ILLINOIS  
**INSULUX**  
*Glass Block*

THERE ARE PLACES IN EVERY BUILDING THAT NEED INSULUX



## Washington Sees Housing Shortage

(Continued from page 110)

not be allowed to "get its nose under the defense tent." To overcome this, Senator Wagner, father of the USHA, has proposed an amendment to the military appropriation bill, which reads as follows:

"Sec. 301A. To the President for allocation solely to projects approved by him, to be developed or assisted pursuant to the provisions of Federal laws by any appropriate departments or agencies of the United States now or hereafter authorized by Congress to develop or assist such projects, to assure the availability of dwellings solely for persons engaged

in national defense activities in localities where the President determines that there is an acute shortage of housing which impedes the national defense program and that the necessary housing would not otherwise be provided when needed, \$300,000,000, to be immediately and continuously available until expended."

It may be noted that while the USHA is not mentioned, the President may use any agency or department of the United States to develop or assist such projects. This amendment is still to be voted on by the Senate. Since the antagonism to the USHA voiced in the House does not appear in the Senate to

the same extent, there is some likelihood of this amendment passing in the upper house. If it does pass, the matter will be argued in the Conference Committee by the House and the Senate. Usually in such cases a compromise is arrived at either by cutting down the amount called for in the amendment or by changing the wording, all of which means that eventually there will be public housing from defense funds, probably with the assistance of the USHA.

It is expected that the first series of State reports on the 1940 Census will be issued in December. Reports on the housing census will be covered by a simple tabulation of the questions asked. Information available will be the number of units occupied and vacant, the condition, the number of rooms, facilities, rents, and values. This will be the first time that a complete tabulation of occupied and unoccupied dwelling units will be available for the entire country. True, these data will be as of April 1940, but for approximately 2,500 cities reporting to the Bureau of Labor Statistics, information will be available to bring the supply data up to date.

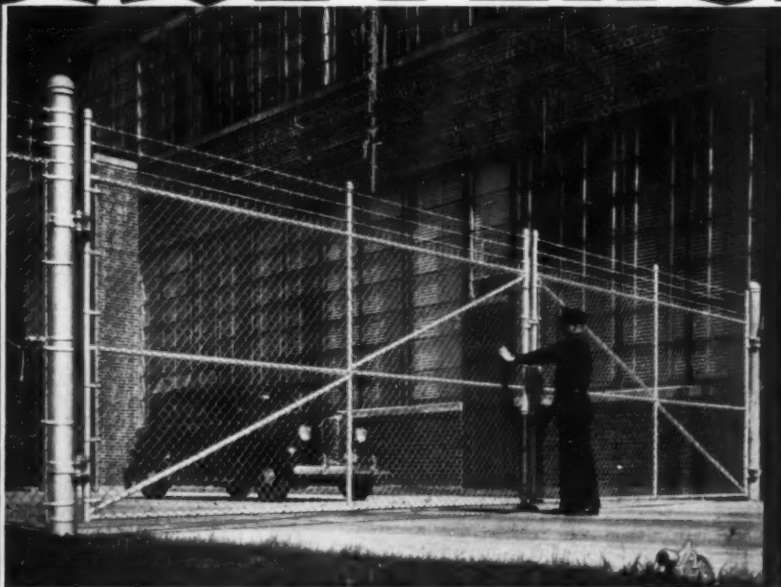
Early next year a second series of reports will be available. These will be cross tabulations showing vacancies by number of rooms, rent, value, and condition, and occupancy by number of rooms, rent, value, and condition, as well as other data derived from cross tabulation of the census questionnaires.

### FHA likely to approve prefabricated assemblies for meeting shortage

For some time there has been a question in the minds of members of the building industry concerning the extent to which new prefabricated assemblies can be used in projects where public funds or private credit are involved. The FHA in general has been slow to relax its regulations which would permit new constructions and prefabricated assemblies to be used, particularly on projects coming under Section 207 (the large-scale rental-housing section). While there are no indications that the FHA will relax its regulations, the Administration is, however, inclined to be more liberal in its interpretations and in its willingness to permit innovations in the use of prefabricated assemblies in those areas where shortages are likely to develop due to defense activities. Much of the interpretation of the regulations is left to local representatives, and it is these local representatives who appear

(Continued on page 114)

# PAGE FENCE



## FENCING — A FUNCTIONAL "MUST"!

Time was when industrial fencing was a "take it or leave it" item. But not now. Today architects are including fence as a functional "must" in their plans. For example, one of the leading industrial architects places property protection on a par with building utility and specifies fencing on every job.

Several factors give Page Fence the preference. Page pioneered chain link fence made in these superior metals: Page heavily galvanized copper-bearing steel, Armco ingot iron, Allegheny stainless steel, Alcoa aluminum. Page developed the only line post exclusively for use with chain

link fence—the Page winged channel post.

Page also created the erection service that assures expert experience and responsibility. In 97 cities, members of the Page Fence Association are fence engineers who are permanently interested in every detail of every job.

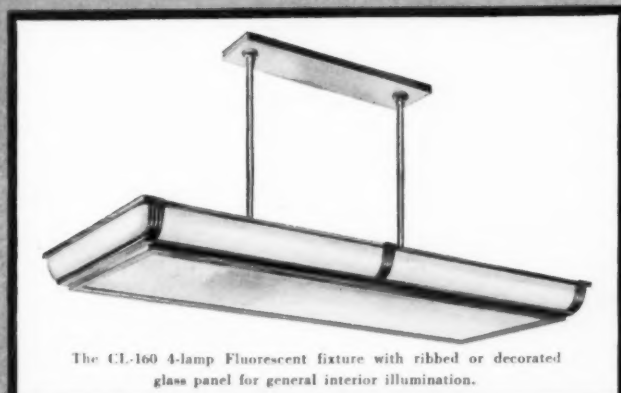
See Sweet's Catalog for detailed information, and write to PAGE FENCE ASSOCIATION, Bridgeport, Conn., Atlanta, Chicago, New York, Pittsburgh or San Francisco for Page Industrial and Residential Fence Books shown here.



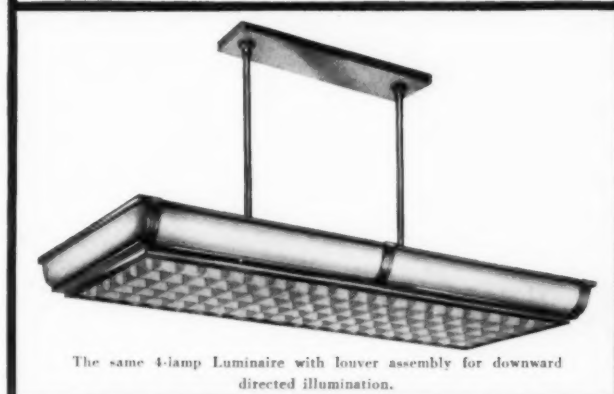
A PRODUCT OF PAGE STEEL & WIRE DIVISION—AMERICAN CHAIN & CABLE COMPANY, INC.

*America's First Wire Fence — Since 1883*

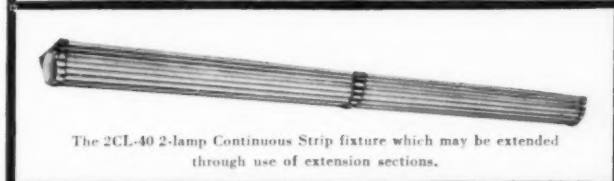
# TOMORROW'S ILLUMINATION TODAY



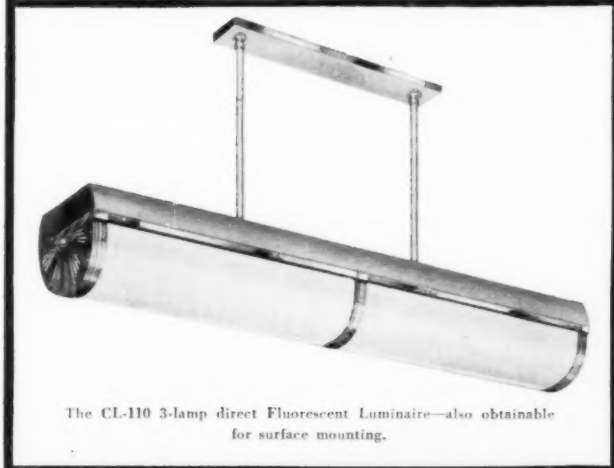
The CL-160 4-lamp Fluorescent fixture with ribbed or decorated glass panel for general interior illumination.



The same 4-lamp Luminaire with louver assembly for downward directed illumination.



The 2CL-40 2-lamp Continuous Strip fixture which may be extended through use of extension sections.



The CL-110 3-lamp direct Fluorescent Luminaire—also obtainable for surface mounting.

## FLUORESCENT LIGHTING *by Westinghouse*

TO both the Architect and the Building Manager, Westinghouse Fluorescent Lighting opens up a new and economical pathway to more light . . . with illumination efficiency far beyond that previously available. Actually, Fluorescent Lighting enables those who plan lighting to start from the beginning with higher, guaranteed illumination values for both commercial and industrial interiors.

Westinghouse, always a leader in the science of illumination, not only makes available a complete line of Fluorescent equipment bearing the Westinghouse trade mark, but provides an unusual choice range of specific units. For instance, the Westinghouse 4-lamp Type CL-160 unit can be supplied either with a plain or decorated glass bottom or with louvers instead of glass. The Type CL-110 3-lamp fixture is furnished with or without glass diffusing shield, or the top lamp for indirect light may be omitted altogether. In addition, a ceiling surface-mounted strip lighting unit—the Type CL-40—may be had in single or 2-lamp lengths with extension sections available for continuous runs.

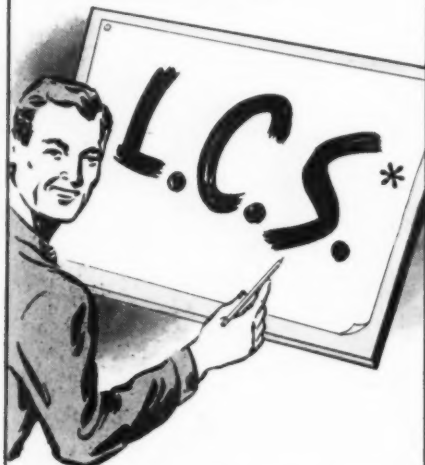
Fluorescent Lighting makes possible the desirable higher illumination levels so necessary in commercial installations. They are 50% cooler—permitting closer placement to light-demanding tasks. They give twice as much light—without harsh glare or shadow. 117 Westinghouse Electric Supply Company offices or Independent Westinghouse Lighting Distributors are at your service locally with stocks and engineering services. Further information may be obtained from Westinghouse Electric & Manufacturing Company, Lighting Division, Edgewater Park, Cleveland, Ohio.

# Westinghouse

## FLUORESCENT LIGHTING



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L.C.S. in heating equipment means its ability to serve year after year — reliably, efficiently and economically. PAYNE'S advanced engineering, relentless testing, and ceaseless inspection assure you of gas-fired furnaces with L.C.S. ☆ Popular the nation over, the compact PAYNE ZONEAIR offers circulating warmth in winter, c-o-o-l ventilation in summer, to one room, a wing, or the whole house, under automatic or manual control. ☆ For any heating problem—cottage or mansion—PAYNEHEAT is first choice among many leading Architects.

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Floor Furnaces	Gravity Furnaces
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Payne FURNACE & SUPPLY CO., INC.  
— BEVERLY HILLS • CALIFORNIA —

## Washington Sees Housing Shortage

(Continued from page 112)

to take a more liberal attitude in the critical areas. Actually there are few prefabricated assemblies on the market, used in rental housing, which are likely to be questioned by FHA inspectors.

In the single-family-dwelling class about eight companies have been producing prefabricated wall panels for house construction. These panels have been tested by the Bureau of Standards in connection with its low-cost housing research program, and the results of the tests have been published and are avail-

able at the United States Government Printing Office at 10 and 15 cents each.

Of the prefabricated wall sections and partition sections that have been tested, all have shown substantial qualities of strength. The Bureau has made tests for compressive strength, transverse loading, racking, and concentrated loads. They have not, however, made water-penetration tests or weathering tests, and it is these latter factors which raise doubt in the mind of the general buying public. Practically all of the sections tested are being used in homes sold with FHA insurance, which means that they are acceptable according to FHA standards.



Fig. 1: Proposed school building

## BRITISH DEVELOP NEW STRUCTURAL SYSTEM

**Economy, speedy erection, salvageability of "Stancon" concrete units suggest possible U. S. applications**

RECENTLY DEVELOPED in response to defense construction needs in Britain, the "Stancon" system of precast concrete units, designed by Architect Stanley Hamp, F.R.I.B.A., may offer possibilities for use in this country in housing, hospital, school, and factory construction, as well as for applications rising out of our own program of national defense. This entirely new form of building unit, which makes possible the speedy and economic erection of camp, hospital, and other military structures, has been approved by the British War Office, and, according to a recent report from the Universal Trade Press Syndicate, "is a great advance upon present building practice." Estimated savings of 12½ to 15% over the brick construction now being used for British military buildings; essential reductions in the use of wood and steel; and the speed with

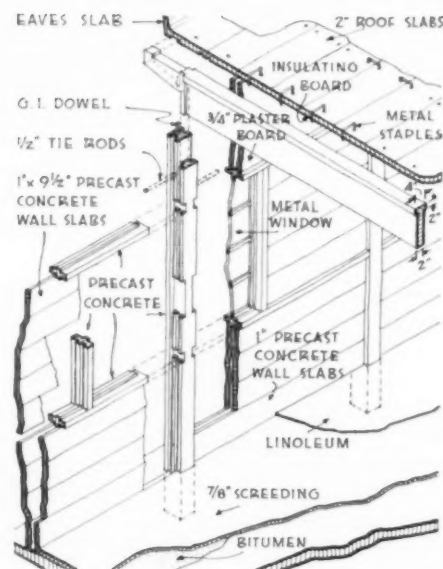


Fig. 2: "Stancon" structural detail

which the units can be erected and their high salvageability for alternative structural purposes would effect very substantial economies over present methods, sponsors of the new system believe.

According to Designer Hamp's description, included in the Syndicate re-

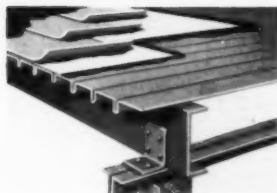
(Continued on page 116)



*For Permanent, Firesafe Construction*  
*... Specify* **STEEL DECK**



Steel Roof Deck provides all the essential qualities of permanence and fire-safety without the disadvantages of excessive weight. In Mahon Steel Roof Deck you get the ultimate in structural design and permanence in roof construction . . . stiffening ribs in Mahon Deck have vertical sides with practically no opening at the deck surface—this insures maximum rigidity and pro-



Cross section of Mahon Steel Roof Deck showing application of insulation and roofing material. Clips can be furnished for attachment, or Mahon Steel Deck can be welded directly to the Steel Purlins.

vides a better bonding surface and greater protection for roofing material. Write for complete details or see Sweet's.

**THE R. C. MAHON COMPANY**

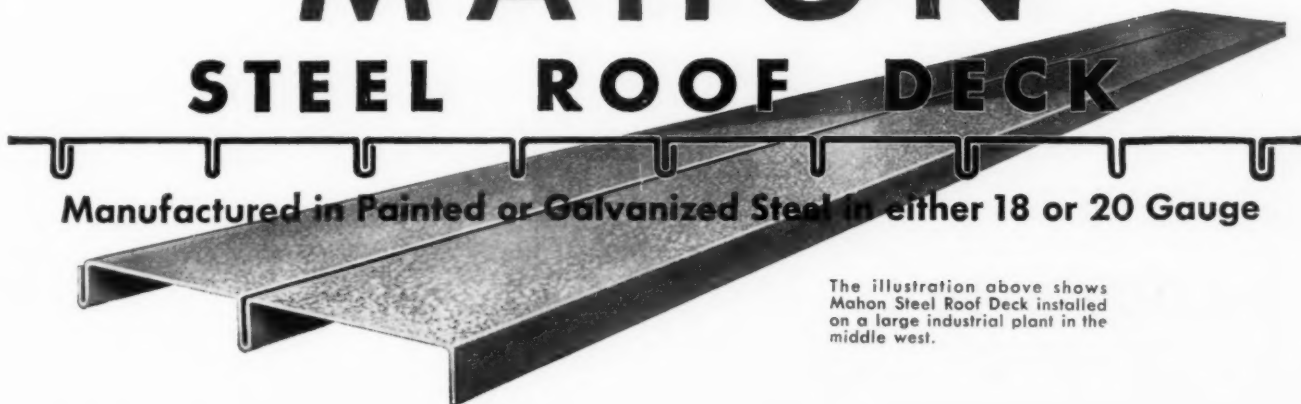
Detroit, Michigan

*Representatives in Principal Cities*

Manufacturers of Steel Roof Deck, Rolling Steel Doors, Shutters and Grilles; Kalamein Doors, Tin Clad Doors and Cast Iron Roof Sumps.

# MAHON

## STEEL ROOF DECK

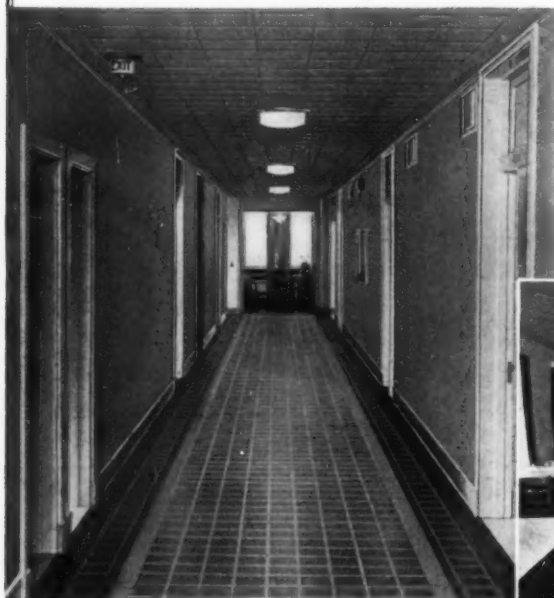


**Manufactured in Painted or Galvanized Steel in either 18 or 20 Gauge**

The illustration above shows Mahon Steel Roof Deck installed on a large industrial plant in the middle west.

# STILL AS THE NIGHT ALL AROUND THE CLOCK!

*...these hospital areas are sound-controlled*



ABOVE: St. Joseph Hospital, Kansas City, Mo., corridor. Footsteps and conversation are subdued because of the ceiling of pleasingly textured Armstrong's Corkoustic. Architects: Wight and Wight. Acoustical Contractor: Weatherproof Products Company.

BELOW: Merritt Hospital, Oakland, California — nurses' dining-room. The 2000-sq.-ft. ceiling of Armstrong's Corkoustic, installed by Peterson-Cobby Co., San Francisco, keeps troublesome noise at a minimum. The material was specified by Ellard L. Slack, Hospital Superintendent.



**N**OISE WON'T BOUNCE back and forth in the hospital areas pictured here . . . because the ceiling in each is covered with sound-absorbing Armstrong's Corkoustic. This cork material preserves quiet and comfort—hushes disturbances.

Armstrong's Corkoustic is easily cleaned and is repaintable. It has a high light-reflection and insulation value, and is distinctly decorative. It is available in a variety of factory applied, attractive pastel colors or

in other colors to your specifications, and in various thicknesses from 1¼" to 1¾". Corkoustic's room-quieting efficiency is indicated by its sound-absorption coefficient—as high as 82% at 512 cycles.

Write today for complete information, a sample, and the new file-sized descriptive booklet, "Tune Out Noise" . . . or see "Sweet's." Armstrong Cork Company, Building Materials Division, 1245 State Street, Lancaster, Pennsylvania.

## Armstrong's ACOUSTICAL MATERIALS

CORKOUSTIC



TEMCOUSTIC

### New British Structural System

(Continued from page 114)

port, a Stancon structure "consists of precast concrete units, portions of which are prestressed, thus making it possible to reduce to a minimum the weight of the steel reinforcement, and at the same time lessen the actual amount of concrete used." (See Figure 2.)

The structure's external walls are composed of concrete stanchions placed on 6-ft. centers and specially grooved to receive two concrete slabs, each 1 in. thick, with 1½ in. of air space separating them. The slabs are anchored into the stanchions by a movable wedge of special design, which presses both the outer and inner slab against bitumen tape attached vertically into the stanchion grooves, thus forming what is described as an "absolutely tight joint" (according to the report, "It has been proved by experiment that even under pressure no water can pass through").

Roofs are flat with projecting eaves. Slabs similar to those used for the walls are placed on ferro-concrete beams which span from stanchion to stanchion. The outer surface of the slab is covered with ⅝ in. of asphalt laid on building paper, while to the underside is attached insulating material for preventing condensation.

The windows, of metal, are designed to eliminate all beadings or linings usually found necessary. Like other elements in the structure, they are fitted into grooves and no cement is used, thus furthering the ease of salvage.

A concrete raft, which also forms the floor, supports the units of the walls and roof. It would normally be laid on hard core and finished on the upper side with screeding over a bitumen dampproofing course.

According to the Syndicate report, "contractors estimate, with the surface concrete in position and with the precast material on the site, that an army sleeping hut, 60 by 19 ft., could be erected complete in four to five days"—in other words, a military camp for 1200 men, requiring 70 such huts, could be set up in a few weeks. Moreover, it is estimated that 30 of these huts would be sufficient, after post-war disassembly and re-erection, to make up a school building, along the lines of the one pictured on page 114, for 480 pupils. Among other estimated conversions are: housing for 450 people, 70 huts; hospital, 52 huts; factory building, 10 huts; and a vacation camp providing for 350 children, 33 huts.

ARCHITECTURAL RECORD

# There's a CRANE Heating System for EVERY House You Plan

**L**OW cost cottage or tycoon's mansion—modest bungalow or two-storied residence—no matter what type of house you design there is a Crane heating system exactly suited to that plan.

The Crane line of heating equipment includes boilers designed for coal—for oil—for gas—boiler burner units in various sizes—various capacities of furnaces for any fuel as well as stokers, oil burners, radiators, convectors, winter air conditioners, controls, water specialties, water heaters, valves and fittings.

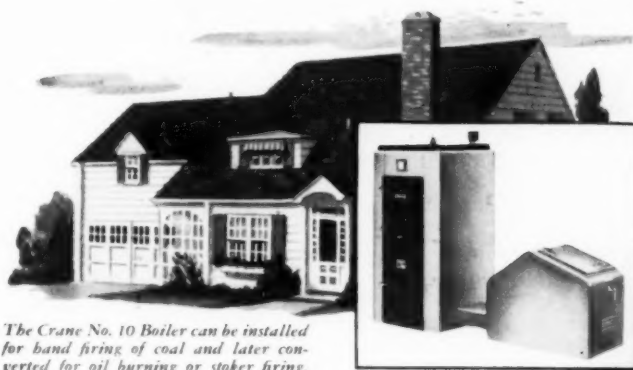
Because of one source of supply, supervision is simplified when you mention "Heating by Crane" in your specifications.

Because every item carries the name Crane, your clients are assured of a completely unified system—all parts working together for greatest efficiency.

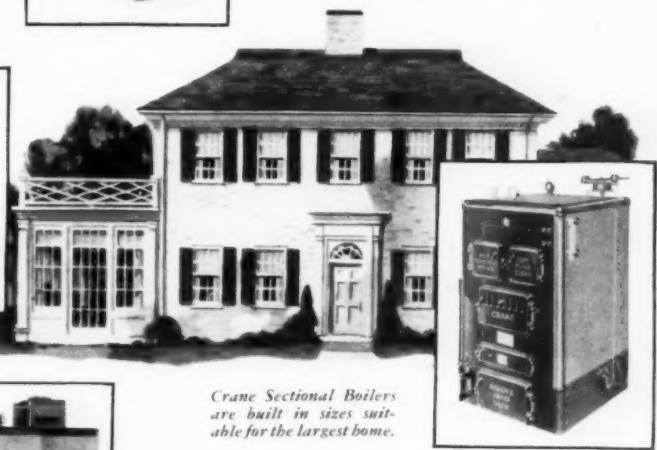
*The Conservoil Boiler Burner Unit is a low-cost oil burning heating unit for the small home.*



*The Crane Oil Burning Furnace—one of the many sizes and types of Crane furnaces for oil or gas consumption.*



*The Crane No. 10 Boiler can be installed for hand firing of coal and later converted for oil burning or stoker firing.*



*Crane Sectional Boilers are built in sizes suitable for the largest home.*



*The Basmor Boiler provides the advantage of completely automatic heat with both natural and manufactured gas.*



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VALVES • FITTINGS • PIPE  
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NATION-WIDE SERVICE THROUGH BRANCHES, WHOLESALERS, PLUMBING AND HEATING CONTRACTORS

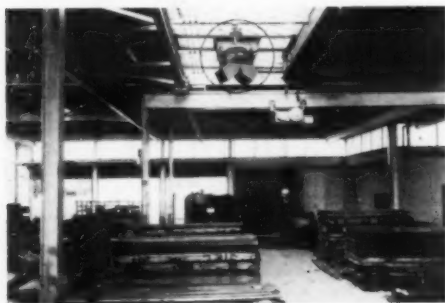
SEPTEMBER 1940



# THE NEW SYSTEM OF PLANT HEATING for the MODERN FACTORY



Slowly revolving outlets . . . an innovation which assures THOROUGH heat distribution . . . a heating comfort never before attained . . . a sensation of fresh, live, invigorating air!



## PRIZE WINNING BUILDINGS

The first prize winner in Borough of Queens Chamber of Commerce 1939 Annual Award for Industrial Building . . . Mohican Steel Company, Glendale, N. Y.; Architect: Roger Garland; Builders: Brown & Matthews, Inc.; Heaters: Four WING Type R-Revolving Discharge Outlets.

The Treasurer of Mohican Steel Company writes:

"We wish to express our gratification concerning the Wing Revolving Discharge Unit Heaters installed in our new building. Not only do they accomplish everything you claimed but savings exceed estimated heating cost by approximately 25%."

Architects now engaged in plans for plant expansion or modernization will find real aid in the WING UNIT HEATER BULLETIN. — Ask for Bulletin H-8.

L. J. WING MFG. CO.  
151 W. 14th St., New York



# WING

## REVOLVING DISCHARGE UNIT HEATERS

## BIRD'S-EYE PLANNING

(Continued from page 79)

### AIR-PROTECTIVE DESIGN

- (1) Precautions to render the factory "invisible" or hard to locate from the air in daytime, during the night, in summer, and in winter time
- (2) Precautions to make the factory less vulnerable or to reduce the effects of explosive or incendiary bombs
- (3) Precautionary measures to insure production, even if part of the plant is destroyed
- (4) Precautions to secure rapid reconstruction of the plant after bombing attacks
- (5) Arrangements for the protection of the workmen, especially air-raid shelters, parking places, transport facilities
- (6) Arrangements for the protection of vital machinery, supplies, utilities, laboratories
- (7) Precautions for the defense against air attacks
- (8) Precautionary measures to deceive the enemy, especially the airplane, about size, importance, or character of the plant

### PRECAUTIONS FOR AIR PROTECTION FALL NATURALLY INTO THREE GROUPS

- (1) **Permanent** precautions of air-protective design which will change permanently the construction and design of manufacturing plants, and will introduce new principles of economy, rentability, and costs. Present building materials have to be re-examined, and new materials and construction worked out
- (2) **Semipermanent** precautions which will be changed from time to time, or which will be used in peace time for other purpose than in war time
- (3) **Temporary** precautions, especially camouflage, only to be used in war times

### CHECK LIST OF FACTORS INVOLVED

#### (1) Subdivision of plant arrangement and shape of buildings

- A. Subdivision of plants into smaller buildings
- B. Location in woods, among trees, in different situations
- C. Roads, tunnels, and supply lines between the buildings
- D. Protection of supply lines
- E. Precautionary measures of supply lines in reserve and connection with different utility centers
- F. Separation of inflammable and explosive processes or products from the main plant to specially protected areas
- G. Settlements for workmen

#### (2) Roofs

- A. Permanent constructions
  - a. roofs with curved shapes
  - b. planted roofs (roof gardens)
  - c. saw-tooth roofs
  - d. timber construction or reinforced-concrete roofs (with tiles or metal sheets)
  - e. color of roofs
- B. Temporary precautions
  - a. projecting slabs to give different shapes
  - b. painting of roofs for camouflage according to the seasons
  - c. preparations of nets to hide the whole building

#### (3) Walls

- A. Lines of low resistance
- B. Framed structures or solid brick walls

- C. Structural framework of steel or reinforced concrete with panel fillings
- D. Splinter protection
- E. Structural damage through the collapse of floors

#### (4) Windows

- A. Elimination of light-reflecting qualities
  - a. through inclination of window panes
  - b. with paint
  - c. with blinds, shutters, or screens
- B. Blackout of windows
  - a. special glass
  - b. with paint, blinds, shutters, etc.
- C. Reduction of breakage of windows
  - a. small panes instead of large ones
  - b. wired glass
  - c. cellophane
- D. Effect of breakage of windows on machinery, stored goods, and manufacturing processes
- E. Projecting roofs to protect the windows

#### (5) Doors

- A. Fireproof, bombproof, gasproof, and splinterproof exits
- B. Advantages of wooden doors compared with steel doors

#### (6) Water supply, water towers

- A. Relation to other buildings
- B. Underground reservoirs
- C. Advantages of natural chute in case of destruction of water pipes
- D. Advantages of a hilly location
- E. Water reservoirs camouflaged as swimming pools
- F. Pump works in rivers
- G. Protection of pipes
- H. Water towers and air-shelter exits

#### (7) Tanks for liquid chemicals

- A. Location within the plant
- B. Dangerous situation near air shelters
- C. Special protection in war time

#### (8) Power stations (the heart of the factory, but should not be within the plant)

- A. Two or three different stations as far away from the plant as possible
- B. Reserve stations with steam or waterpower
- C. Underground stations and underground communications

#### (9) Fire watch and fire brigade

- A. Decentralization into small units placed in different parts of the plant
- B. Readiness of fire engines and fire brigades with special training
- C. Special equipment, lecture rooms, and training rooms

#### (10) Chimneys (visible from far away)

- A. Possible replacement of chimneys by artificial draught or blowers

#### (11) Electrical equipment

- A. New kinds of artificial light
- B. Possibilities of repairing or replacing damaged installations

#### C. Shockproof apparatus and lamps

#### (12) Laboratories (Testing machines, special equipment need special protection)

- A. In separate buildings
- B. Underground

#### (13) Parking areas

- A. White parking areas are easily located from the sky. Paving should be darkened
- B. Trees on parking areas
- C. Underground areas connected with shelters

#### (14) Air shelters

- A. Small units preferable to large shelters
- B. Entrance and exit
- C. Shape, location, and equipment

# LET'S SKIP THE BLINDFOLD TESTS—



## AND GET THE REAL ROOFING FACTS!

- There are several good roofs today. You know it. We know it. You could almost select one blindfolded, and be pretty sure your client was getting his money's worth.
- But Barber makes a built-up roof with extra values that are real eye-openers. It's different from any other built-up roof, because it contains a certain kind of asphalt no other roofing manufacturer uses. That asphalt is Trinidad Native Lake Asphalt, the remarkable nature-made weatherproofer found only in the famous asphalt lake in Trinidad.
- In this one asphalt are combined desirable properties that roofing men recognize as ideal for a good roof — superb ductility, inherent self-

healing ability and unrivaled protective qualities.

- Due to the remarkable features of Trinidad Native Lake Asphalt, Barber bonds *smooth-top* built-up roofings anywhere in the United States. Barber's own system of laboratory inspection, rigidly enforced, is another important guarantee of quality to you and to your client.
- Above all, the service record of Barber Genasco Bonded Built-Up Roofing, made with Trinidad Native Lake Asphalt, gives you the kind of on-the-job proof of quality and economy you want to stand behind every built-up roof you specify.

**BARBER ASPHALT CORPORATION**  
BARBER NEW JERSEY

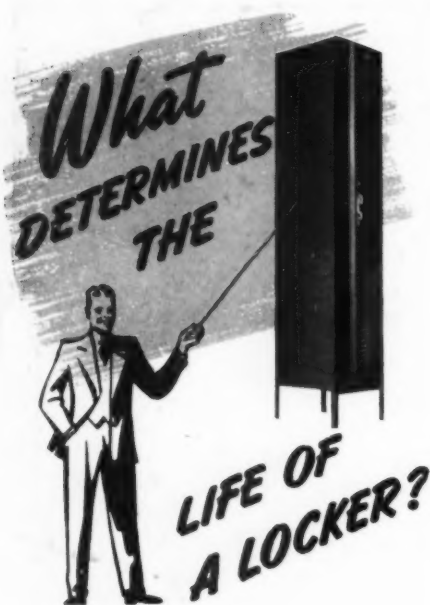


Barber Products include Shingles, Sidings, Roll Roofings, Bonded and other types of Built-Up Roofings, Waterproofing Asphalts and Fabrics, Resurfacer, Asphalt Protective Products (Plastics and Liquids), Spandrel Beam Waterproofings (Spandrel Cloth and Cement).

# BARBER

GENASCO QUALITY

→ means a good Roof



• Reinforcement at every point where damage or excessive wear might occur! That's what makes for long life in lockers! And that's why A-S-E Lockers are winning such a complete acceptance—they're built to last as long as the building. Cross channel, bottom and lower frame channel, latch bar, door jamb—at every point where extra strength is needed, strength has been built in! And records for greater durability and economy in hundreds of buildings prove the success of A-S-E design and construction.

## **A-S-E LOCKERS** **ARE BUILT FOR EVERY NEED**

No matter what your locker requirements are, A-S-E has a type and size to meet them exactly. Consider *all* the facts about these extra durable lockers and see why they assure extra value. We'll be glad to send you a copy of the A-S-E Catalog, containing authentic information about the vital points that determine the durability and satisfactory operation of any locker. The coupon below will bring you your copy—no obligation.



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## REVIEWS OF CURRENT BOOKS

(Continued from page 80)

S/R equals 1.8. Reading this in the chart, he sees also that \$10,000 homes can be afforded by only 3% of the families in the United States, omitting from consideration those on relief and those who live on farms, while 39% of the same group of families would be able to occupy \$3,000 houses. To the architect who can look below the surface, it will be obvious that a change in the relation of the factors involved will change the percentage of the population that can afford a given type of facilities. Hence, it may be brought home to him that the architect's task is not alone to design housing and to reduce the original cost of such housing. It is also incumbent upon him to understand those other factors which control rent and, through better knowledge and control of rental factors, to improve the breadth of the market which is open to him.

In Appendix I of the report it is indicated that the graphs of family income shown in Chart A may be varied for different family types and even for communities of varying size or for various regions of the nation. By this means, variations in the graphs shown on "B" are plotted. Of course, it is a question how accurate such graphs can be made.

It is a question, too, as to how accurately the infinite variety of combinations of variable factors may be interpreted. The market for new housing is in part to provide for the increasing number of new families seeking shelter and in part to provide shelter for families presently but unsatisfactorily housed. Virtually no research has yet been done to show the purchasing range and total purchasing power of such families as distinguished from all families.

A great share of the burden of present housing is due to the debt of existing mortgages which is still carried plus the burden of economic waste in city development and administration which is reflected in taxes. The flight from the city, which has been made possible by the automobile and by improved transit, reflects the effort to escape these burdens inherited from the past. To be realistic, factors which are used to calculate economic rent cannot ignore the cost of carrying the burdens imposed both by past mistakes and by our inherited methods of calculation. By suggesting a method of calculation which brings use of these factors into the open, the Bemis Foundation prepares the way for an increasing realization of the pos-

sible gains to be achieved by learning how to vary and control these factors which play such an important part in the calculation of rent. It is to be regretted, however, that the report does not place more emphasis on the economic background and do more to clarify underlying considerations that govern selection of variable factors that must be used in connection with the graphs.

—Arthur C. Holden

**THE AMERICAN SCHOOL SYSTEM,**  
by Aubrey A. Douglass. Farrar and Rinehart, Inc., New York. Second Edition, 1940. 745 pp., 5 1/2 by 8 1/4 in. Price, \$3.00.

THIS REVISED EDITION of a standard work, besides tracing the growth of our American educational systems from Colonial times, describes the effects of recent economic and social changes on trends which had become established in the early 1930's. Although the author writes primarily from the educational point of view, and the book's architectural significance is consequently secondary, such a survey of the field should prove valuable to an architect whose practice includes school design.

For the American school has changed rapidly in the last few years; many school plans demonstrate advances in educational philosophy, translated into a variety of living architecture. This is as it should be. But there are also many, many schools whose plans demonstrate, at most, the best thought of the year 1910 or thereabouts. We are a third of a century beyond that. To the architect of yesterday's school, the history-story of the American school could be a fascinating revelation. It is undoubtedly one of the inspirations of the schools of tomorrow which are being erected in increasing numbers throughout the country.

This book discusses the scope, origins, and purposes of public educational programs; examines curricular and extra-curricular activities, and classroom methods; and presents the evolution of pre-school, elementary, secondary, and higher educational systems. It deals with special problems: training for occupation, education of "exceptional" children, rural schools, adult education; reports upon teaching personnel, the results they achieve, and the way education is financed and controlled; and closes with a frank statement of some of the controversies which gather around the school question—controversies which are a healthy indication of probable future growth.

ARCHITECTURAL RECORD